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**Mercator's Map of the World, 1538.** Facsimile in black-and-white, reproduced from the original in the Society's collection (only two original copies of this map are known). 1885.

THE
GEOGRAPHICAL REVIEW

VOL. IV JULY, 1917 NO. 1

# AËRONAUTICAL CHARTS

By OMAR B. WHITAKER
The Sperry Gyroscope Company

In November, 1915, the well-known aviator, the late Victor Carlstrom, made a memorable flight from Toronto, Canada, to New York, flying without mishap until his arrival at the latter place, where darkness and a low-lying haze rendered it impossible for him to distinguish Governors Island, his intended destination. Believing it a waste of valuable time to make a further search for Governors Island, Carlstrom headed his machine for New Jersey, where he felt certain that territory suitable for a landing place could be found. He had not traveled far from New York when he sighted a stretch of country that seemed perfectly suited to his needs. When it was too late, however, to prevent a landing, he discovered that the stretch of country was marsh land of the "Jersey Meadows," and it was only by his skill and quick thought that he was able to save himself and his machine. Some idea may be had of his predicament when it is stated that it required a number of workmen and a motor truck several days to extricate the machine from the swamp.

Peculiar as it may seem, but few have given this singular instance much thought—merely accepting it as an aviator's misfortune. Carlstrom's experience was singular in that it happened at the very end of such a noteworthy achievement, but the misjudging of landing places has been the direct cause of many serious accidents which date back to the time when the airplane was first able to leave its home field. Had Carlstrom been equipped with an aëronautical chart of the proper kind, an incident which might have easily proved a serious accident could have been averted. His equipment lacked such a chart for the very good reason that none existed. Clippings from atlas and other small-scale maps showing only towns, railroads, and rivers went to make up the chart that was used for his flight.

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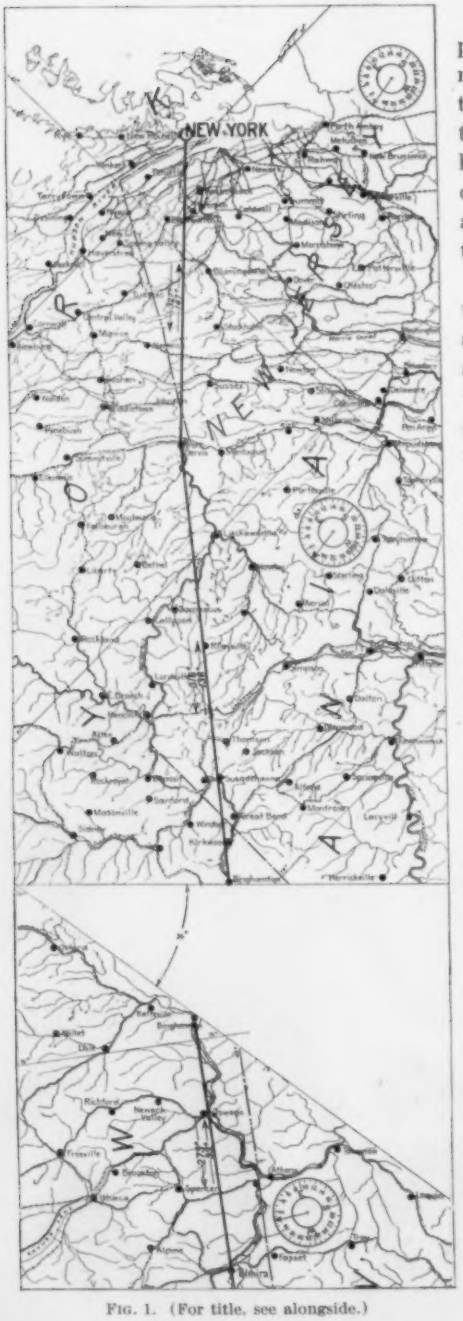


FIG. 1. (For title, see alongside.)

The development of the airplane has been so rapid and so much attention has been centered upon the machine itself that other things which go to help make the airplane a success have suffered neglect. The aëronautical chart is one of these.

The first aëronautical charts used in this country were probably composed of clippings from atlas and other maps, owing to the want of better material. One of the most complete charts of this sort up to that time was doubtless the one prepared for Lawrence Sperry's flight from Amityville, L. I., to Boston in the summer of 1916. As most of his flight was to be made over water, several large-scale standard marine charts covering the route were obtained and the course layed out on them. A strip ten inches wide, five inches either side of the course, was cut from each chart, and in order to facilitate their use the strips were mounted on linen and arranged to run over a pair of rollers.

Numerous requests for information concerning compass

TITLE OF FIG. 1—Reduced facsimile of a section of an aëronautical chart prepared by the Sperry Gyroscope Company, the original being on the scale of 8 miles to the inch. North is at the lower left.

The beginning of the New York-Chicago route is indicated by the heavy black line, each leg of the course being marked by its azimuth, for both going and coming. Wedge-shaped pieces similar to the one shown here are introduced in order to straighten out the turns made by the course and in order to produce a rectilinear map which can be passed over rollers (see Fig. 2.)

errors, the exact course to be steered between stated cities, etc., having been received by the Sperry Gyroscope Company because of their wide experience in aërial navigation, the company decided to meet the rapidly increasing demand by undertaking the preparation of aëronautical charts. A chart of Long Island was the first to be compiled. Shortly afterward a strip of territory from Fort Wadsworth, N. Y., to Princeton, N. J., was charted. This chart, combined with that of Long Island, was used by the group of airmen that flew to Princeton for the football game between Princeton and Yale in November, 1916. The Sperry aëronautical charts are made from

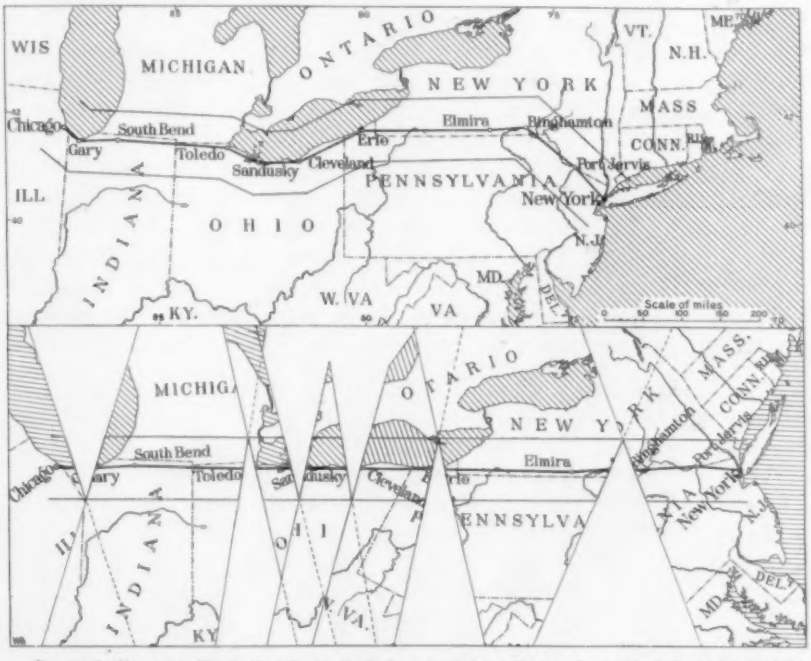


FIG. 2—Outline maps illustrating the method of producing rectilinear aëronautical charts by straightening out the course.

The upper half shows the route between New York and Chicago laid out on a regular map, with the bounding lines indicated of the territory to be included. The lower half shows this map cut apart, as it were, at the turning points in the course and straightened out. In drafting the final map the areas outside the bounding lines are excluded. Figure 1 shows the eastern end of the strip in detail.

maps compiled by the U. S. Geological Survey and are on a scale of from 2⅔ to 8 miles to the inch. Figure 1 shows the last lap of a Chicago-New York chart. The distinctive feature of these charts is that, regardless of the number of turns made in any particular flight, the whole chart is presented in a straight strip only ten inches wide. The advantage of such a method is that almost any scale may be used without making the chart cumbersome, since it lends itself readily to a pair of chart rollers, which can be mounted in a case and attached to the instrument cowl, if so desired.

The method used to prepare one of these charts may be more clearly shown by a few simple illustrations. The upper half of Figure 2 represents an airplane route between New York and Chicago as laid out on a map and bounded on either side by lines parallel to it and enclosing the strip of country to be charted. The remainder can now be cut away, thus eliminating a large amount of useless map. The straightening out of the course is attained by cutting the chart transversely at each turning point and arranging the separate sections as shown in the lower half of Figure 2. It will be noted from Figure 1 that in the vacant triangular space at the turning points the angular value of the change in the chart is designated. This will also be the change in course to be made at each point, providing the approach and departure are to be made along a course parallel to the sides of the chart, which is not always the case, however. It is better, therefore, to mark each leg of the course with its proper azimuth, as is done on Figure 1. This will also save the pilot the trouble, possibly at a critical time, of first considering whether the change should be added to or subtracted from the reading of his present course and then making the necessary calculation to obtain his new course.

As to content, the charts in question show the location of cities, railroads, and rivers. Up to the present time only one set of these charts has been made in colors, this being the one of Long Island. All of the remainder are in black and white.

Turning now from a discussion of what has been done in this field by one organization, it may be well to consider in general what remains to be done to develop fully this important adjunct of flying.

The requirements made of land charts naturally divide them into two general types: one for cross-country flights and the other for local flights.

Every aëronautical chart should portray all, or as many as possible, of the outstanding and essential features of the territory it covers. Among those of most value to the pilot are cities, towns, roads, railroads, rivers, landing places, altitudes, fuel and oil supply depots, and especially places that appear from above to be good landing places but are in reality swamps or other treacherous ground. The marking of a city or town should show some of its special characteristics, in order to aid the pilot in distinguishing it from other nearby towns of similar size. Probably the day is not far away when every city, town, and hamlet will have its name displayed in such a way that it will be legible from a great altitude. Such a plan would, however, be a disadvantage from a military point of view, as it would readily impart important knowledge to an enemy airman. Towns having facilities for making repairs to the plane should be so designated. Roads and railroads are clearly seen from above and are much used as landmarks. Rivers are also important landmarks and should be clearly designated.

Landing places should be divided into two groups, possible and good

landing places. The advantage of this division is that it gives the airman some choice in his landing place if the need of landing is not immediate. The position of telephone and telegraph wires and other dangerous obstructions should be indicated on all marked landing places. The experience of Victor Carlstrom, as related above, is sufficient proof of the need of marking dangerous territory that might deceive a pilot into believing it a good landing place.

In addition to these elements, all charts should carry a number of compass roses to indicate the meridian and the magnetic declination at various places along the course. A good way to help indicate the course would be to place compass roses at the beginning of each new course and every six or seven inches thereafter, the center of these roses to be on the course line and the north pointing to the magnetic north. The pilot would then have continually before him a graphic representation of the relation of his compass lubber-line to the card. In such a case the course to be steered would be indicated on the rose at the point where the course line passes through it and on the side toward which one may be traveling from the center—this on the assumption that the compass deviation error is negligible.

Charts for local use may be made on a large scale and marked similarly to those just described. A more convenient shape for these charts would be in the form of a rectangle or square with the flying field near the center.

All land charts should be colored in a manner to bring out the landmarks in their relative importance to the airman. The use of a standard code of symbols for indicating many of the country's features will prevent overcrowding and confusion.

The marine aëronautical chart has a very good beginning in the existing standard marine charts. These can be used to good advantage as they now stand, but a few slight modifications may render them even more suitable to the aviator's needs. The soundings need not be recorded, as they are of little or no value to the airman, but it would be well to indicate all of the distinctive features of the country for two or three miles inland. This would act as a great aid to an aviator who may have lost his way and perhaps save him the inconvenience and risk of landing in unfamiliar waters to inquire his whereabouts. Upon first thought it may be inferred that only poor navigation or incorrect course calculation could cause one to become so completely lost, but the wind has succeeded in playing many practical jokes on experienced aviators by carrying them considerably off their course. This is even more likely to be the case on marine than on land trips, owing to the absence of markings at sea.

Fortunately, a considerable amount, if not all, of the material required for aëronautical charts is at present available in the form of government and other maps, but much experience and time will be required to put it into useful form.

# POLAND: THE LAND AND THE STATE*

By EUGENIUSZ ROMER
Professor of Geography, University of Lemberg

## The Physical Basis of Poland's History

The foundation of the historical life of nations is laid down in the relatively unchanging features of the earth. Strong and organized human wills can temporarily deflect national life from the course favored by nature, but, sooner or later, life flows back into natural channels, and its return is almost invariably marked by some upheaval in customs, character, or national life.

Let us glance at the relationship between historical life and its natural foundations in the Vistula region. Along this river led the route followed by the Phenicians in their trading voyages to the Baltic for amber, as is evidenced by cowry shells in the form of amulets which have been found in prehistoric tombs along the Baltic littoral. In the fourth century of our era, as one of a series of racial migrations, a Slavic wave appears for the second time, driving the Goths against the Roman Empire. *Pulsae a superioribus barbaris,* says Julius Capitolinus,[1] referring to the Goths. The Slavs continued to push onward, until the limit of their westward expansion was set by Charlemagne, whose name stood for power among the western Slavs.

The western frontier of Slav territory was at that time marked by the rivers Elbe and Saale (Fig. 1).[2] Settlements on the right bank of those rivers have preserved to this day the evidence of their Slav origin in their characteristic circular and road-side arrangement (termed *Runddörfer* and *Strassendörfer* by German historians). Traces of Slavic colonization are not lacking on the left banks either, but the scattered circular villages

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* This article is based on a translation of an original manuscript in Polish by Professor Romer which was received by the Society before the entry of the United States into the war. It was originally accompanied by a series of maps by the author, which, however, were not passed by the military censor. With the guidance of the brief titles and references to the sources interspersed in the text, the present series was compiled. Professor Romer is of course not responsible for the accuracy of either the maps or the translation.

[1] P. J. Schafarik: Slavische Altertümer, Leipzig, 1843-44, Vol. 1, p. 507; Montelius: Die Einwanderung der Slaven, *Korrespondenz-Blatt für Anthropol., Ethnolog. und Urgeschichte,* Vol. 30, p. 127.

[2] Figs. 1-3 and 5-12 are based on the following sources (on which plates, is indicated in each instance):
Karl von Spruner: Hand-Atlas für die Geschichte des Mittelalters und der neueren Zeit. Revised by Theodor Menke. 90 maps and 376 insets. Justus Perthes, Gotha, 3rd edit., 1879.
G. Droysen: Allgemeiner Historischer Handatlas. Edited by Richard Andree. 96 maps. Velhagen & Klasing, Leipzig, 1886.
R. L. Poole: Historical Atlas of Modern Europe. 90 maps. Clarendon Press, Oxford, 1902.
F. Schrader: Atlas de géographie historique. 55 maps. Hachette et Cie., Paris, edition of 1911.
F. W. Putzger: Historischer Schul-Atlas zur alten, mittleren und neuen Geschichte. Edited by Alfred Baldamus and Ernst Schwabe. 234 maps. Velhagen & Klasing, Leipzig, 29th edition, 1905.
W. R. Shepherd: Historical Atlas. 216 maps. Henry Holt and Co., New York, 1911. [Based largely on the preceding.]

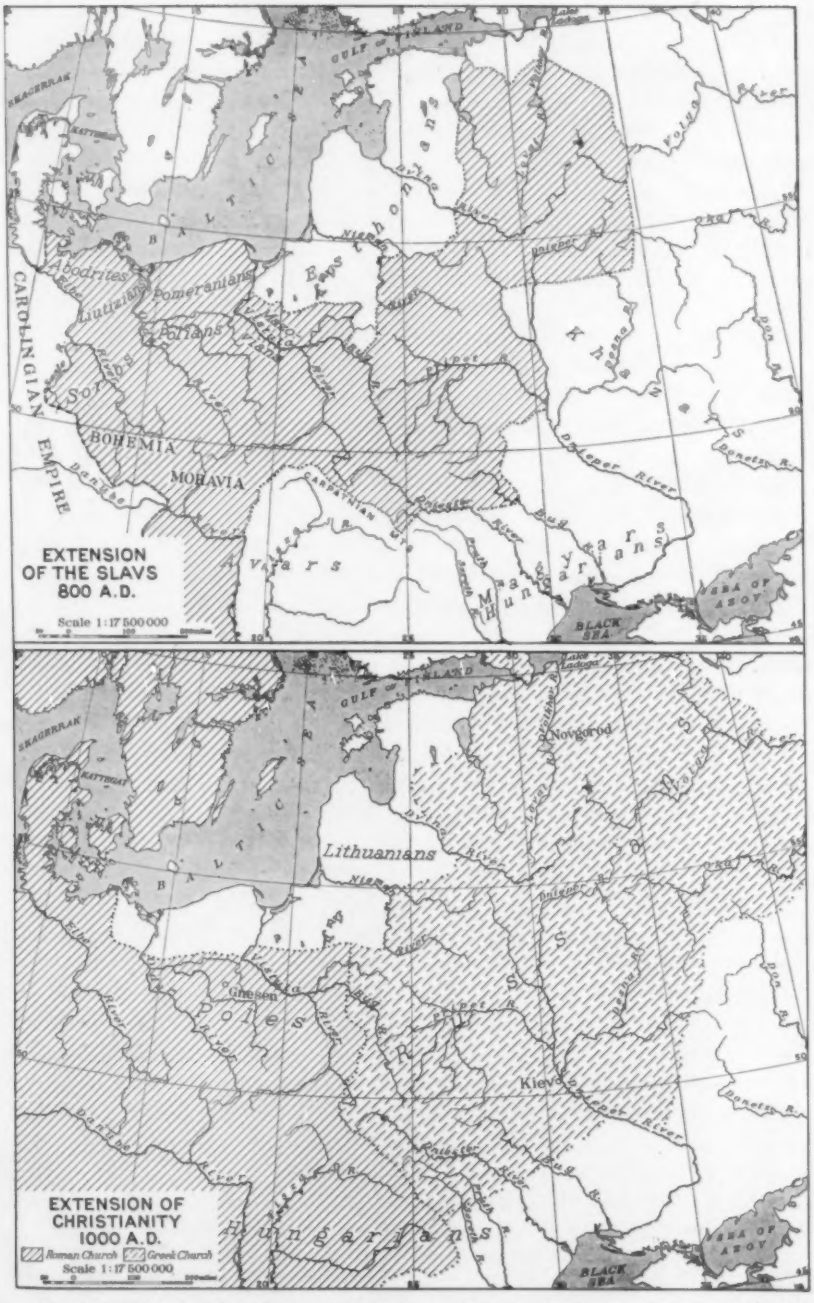


FIG. 1 (upper). Based on Spruner-Menke, Pl. 3, and Shepherd, Pl. 54-55. The area designated "Esthonians" included Lithuanians and other tribes.

FIG. 2 (lower). Based on Shepherd, Pl. 66-67, inset. On Spruner-Menke, Pl. 7, a pagan zone intervenes between the Oka River and the Gulf of Finland.

here are less frequent than the predominating village of compact form *(Haufendorf)* typical of Germanic settlements.[3]

The Slav world of that period extended, in the west, northward to the Baltic between the lower Vistula and the Oder, while farther east it was separated from the sea by the territory of the Esthonian and Lithuanian tribes. In the south it reached the Carpathians, and along the rivers Dniester and Bug it was pushing towards the Black Sea, from which it was barred, however, by the powerful state of the Khazars and their kindred peoples the Bulgars and Magyars. At this period Slav settlements in the northeast extended along the northern affluents of the Dnieper almost to the Gulf of Finland. But they did not quite reach the sea, being stopped by a seemingly small obstacle.

Steep, almost precipitous, escarpments rise in places to a height of one or two hundred feet, over which the affluents of the Gulf of Finland and of Lake Ladoga fall in roaring cataracts. In the face of such obstacles to communication, Slav expansion always halted. For the same reason it avoided the meridional part of the course of the Niemen, between the present sites of Grodno and Kovno, where that river, leaving its upper, relatively shallow valley, flows through a deeply cut and picturesquely winding ravine. Nowhere did the Slavs of those days penetrate into the region of the eastern affluents of the Dnieper. They were held back, possibly, by the main river itself, which flows with great volume at the time of the spring floods. They halted also at the middle of the course of other Black Sea rivers, such as the Dniester and Bug, at the point where these rivers descend from the broad meadows of the upland and enter deep, wooded ravines.

The Slavs of that time moved along broad valleys. They stopped before narrow and winding ravines, at the thresholds of valleys, and in front of waterfalls. They were stopped by Charlemagne on the Elbe where that river, deprived of any western affluents below the mouth of the Saale, is in itself a barrier for a people that moved only along broad valleys.

What were the peoples whom Ptolemy called by the general name of *Venedae*, and Procopius by that of *Sclaveni* or *Slaveni?* Already differentiated, they formed numerous groups in the Frankish period. The eastern of these tribes, nameless at first, were destined to play a prominent part in later history. In the southwest the Bohemian-Moravian group settled down in a hilly country, so situated that it was alike protected from hostile neighbors and accessible both to Roman and Byzantine influences. No wonder, then, that this particular Slavic group made the earliest entry upon the arena of history. Through their German neighbors we happen to know the names of many of the tribes that resided in the western lowlands, such as the Abodrites (Obotrites), the Liutizians, and the Sorbs, all of them belonging

[3] A. Meitzen: Siedelung und Agrarwesen der Westgermanen und Ostgermanen, der Kelten, Römer, Finnen und Slaven; Wanderungen, Anbau und Agrarrecht der Völker Europas nördlich der Alpen, 3 vols. and atlas, Berlin, 1895; reference in Vol. 3, Part 1, and atlas.

to the group of the Polabs, or Slavs of the Elbe. The history of all these tribes has but one tale to tell: the alternative of extermination or Germanization. To the east of the Polabs resided the Lekhs, or Poles, among whom Nestor, an early chronicler, counts the Polians, Mazovians, Pomeranians, and Liutizians.[4] From Nestor's account one must conclude that the Liutizians and probably the entire group of the Polabs belonged, in tribe and language, to the Poles (Lekhs). This historical inference is confirmed by linguistic research.[5] A further inference of importance is to be derived from linguistics. If we cast a glance upon Nitsch's map showing the present distribution of the various forms of Polish[6] it will be seen that the section where the language is the most homogeneous, where it possesses the smallest number of peculiarities of dialect, and where it most closely approaches the accepted literary form, is located on the westernmost edge of Polish linguistic territory. Is not this extreme peripheral position of the main body of the Polish tongue a proof that Germanization has not been limited to the Polabs alone?

Germanization went hand in hand with Christianity, for, as the eminent historian Potkanski puts it,[7] together with the cross the German apostles carried into Slavdom the boundary posts of the German state. This movement had its good side, however. It stimulated the Slavs to political organization and, consequently, to an apostolic propaganda of their own as a shield for national independence.

But we are not concerned here with historical processes but with the relationship existing between them and the land. Christianity radiated across Slavdom from both Roman and Byzantine sources. It penetrated through various channels. The movement reached its greatest intensity in the tenth century. Figure 2 illustrates the actual extent of Christianity in the year 1000. This map has a certain resemblance to that of the extension of the Slavs two hundred years before. In the direction of the Baltic, Christianity met the same or even greater obstacles than did Slavdom in the Frankish period. Just as Slavdom had, at that time, avoided the gorge of the Niemen between Grodno and Kovno, so Christianity came to a standstill before this obstacle. In the east Christianity extended farther in the year 1000 than Slavdom did in the time of Charlemagne. Its victorious advance was only stopped on the lower Dnieper where the rapids[8] caused by the passage of that river through the South Russian granite threshold form an obstacle to navigation.

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[4] Schafarik, *op. cit.*, pp. 349-409.

[5] Rozwadowski: The Relationship between the Polish and Other Slavonic Languages, *Polish Encyclopedia*, Vol. 2, p. 379, Acad. of Sci., Cracow, 1915. [In Polish.]

[6] Accompanying Casimir Nitsch: Dialectology of the Polish Language, *Polish Encyclopedia*, Vol. 2, p. 238 ff., Acad. of Sci., Cracow, 1915. [In Polish.]

See also *idem*: Quelques remarques sur la langue polabe, *Archiv für slavische Philologie*, 1907, p. 169 ff.

[7] Potkanski: Cracow under the Piasts, *Travaux de l'Acad. des Sci. de Cracovie: Classe d'Hist. et de Philos.*, Vol. 35, 1898, p. 170. [In Polish.]

[8] *Porogy*, literally "thresholds."

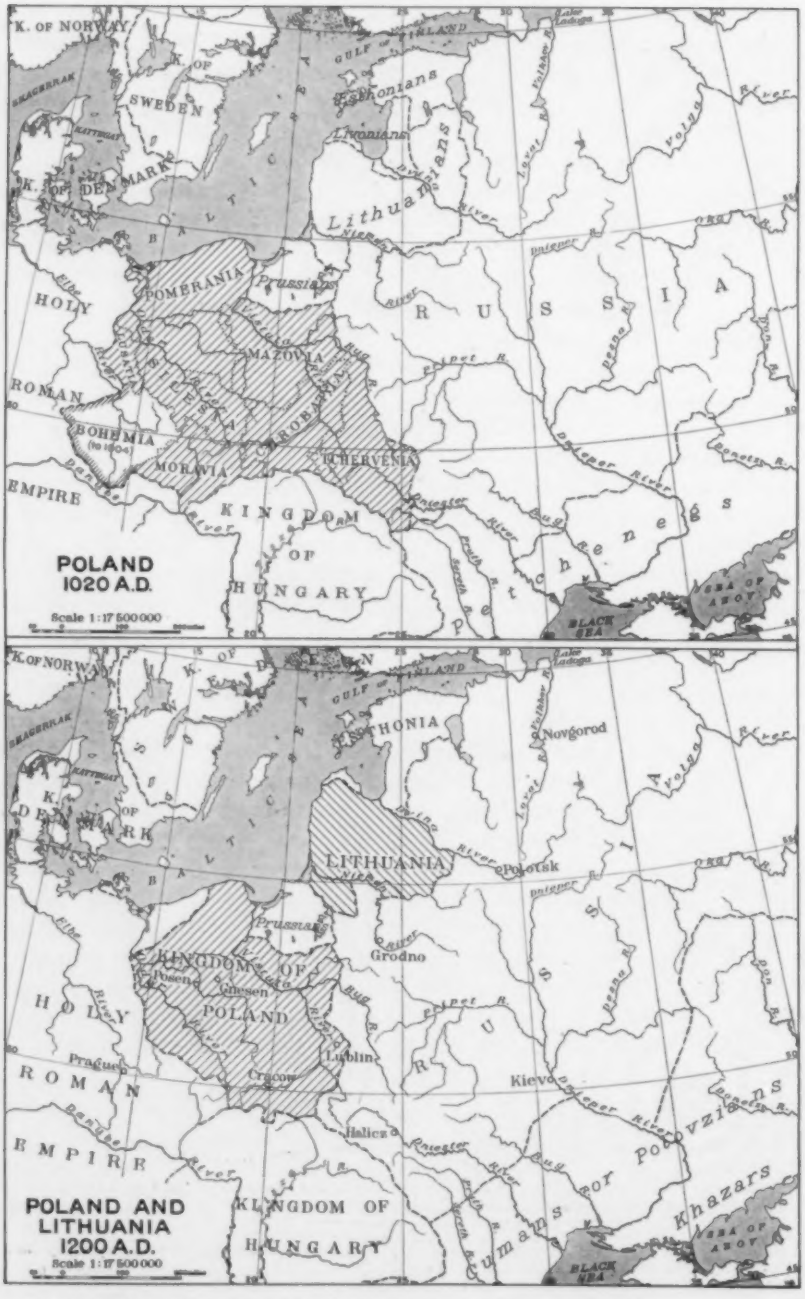


FIG. 3 (upper). Based on Spruner-Menke, Pl. 69, inset, and Putzger, Pl. 15, inset.

FIG. 5 (lower). Based on Shepherd, Pl. 70-71. . The term "Russia" on Figs. 3 and 5 is used only in a general sense to group together the various constituent states.

At the end of the tenth century the now fully developed Polish state becomes an historical factor. The political expansion of this state during the reign of Boleslav the Great (992-1025) strikes the keynote of the nation's forthcoming development as conditioned by its geographical setting (Fig. 3). If we eliminate the districts which had succumbed to early Germanization, we are immediately struck by the likeness existing between the extent of Slavdom in 800, of Christianity in 1000, and of the Polish state at the beginning of the eleventh century. When we remember that Poland occupied, under Boleslav's predecessor, in 962, an area of only 40,000 square miles, while it increased fifty years later to over 170,000 square miles, it becomes evident that the sword of Boleslav had found a powerful ally in the individuality of the land.

### THE NATURAL HIGHWAYS OF POLAND'S POLITICAL EXPANSION

The territorial extent of Poland at the time of Boleslav and its subsequent history demonstrate the importance of four great natural highways:

(1) The series of great east-and-west valleys (Fig. 4) which extend across the Polish-German lowland from the Pripet to the Elbe[9] athwart whose eastern end the Poland of Boleslav came to halt on the line of the Bug.[10] This fact, at variance with the contemporary expansion of Christianity and also with that of Slavdom in 800, is explained by the simultaneous rise, out of the Slavic body, of two states, that of the Ruthenia of Kiev and that of Poland, both of them moving to some extent along the same road and pressing upon each other on the line of the Bug.

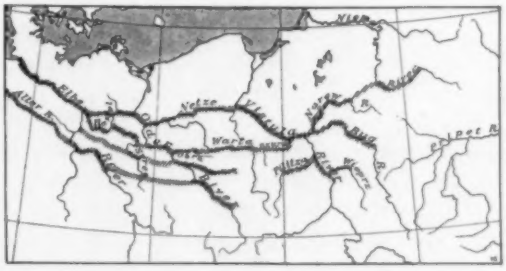


FIG. 4—The east-and-west, proglacial valleys of the Polish-German Lowland. Scale, 1:17,500,000. Based on Wahnschaffe and Keilhack (see footnote 9), extended to the east according to Hettner: Länderkunde von Europa.

(2) The southeastern highway, along which Poland acquired, at the dawn of her history, that part of Ruthenia called Red Russia, and which brought Boleslav, on the trail of Christianity, to the gates of Kiev.

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[9] The *Urstromtäler*, or proglacial valleys, of German geologists. See F. Wahnschaffe: Die Oberflächengestaltung des norddeutschen Flachlandes, with map, *Forschungen zur deutschen Landes- und Volkskunde*, Vol. 6, No. 1, 3rd edit., Stuttgart, 1909; and K. Keilhack: Die Stillstandslagen des letzten Inlandeises und die hydrographische Entwickelung des pommerschen Küstengebietes, with map, *Jahrb. Kgl. Preuss. Landesanstalt*, 1898, pp. 90-152.—EDIT. NOTE.

[10] The main right tributary of the Vistula. Not to be confused with the river of the same name, previously referred to, which drains into the Black Sea. In Russian, as in English, both names are spelled alike, but in Polish the former is written *Bug* and the latter *Boh*.—EDIT. NOTE.

(3) The southwestern highway, through which Boleslav's Poland reached the hills of Bohemia and Moravia and even advanced to the Danube.

(4) The northern, Baltic highway, along which Poland first attained the sea.

Of all these highways only the east-and-west valleys were entirely free from natural obstacles. Poland's development in an easterly direction had no obstacle to fear but that of some other organized national will: a Lithuania or Ruthenia. All the other highways, although definitely marked out by the natural features of the country, partook of the nature of defiles. Whoever held the defile became master of the adjoining territory. The valiant armies of Boleslav forced the southwestern defile[11] and at once came into possession of the Bohemian lands, extending as far as the Danube. But during the entire century that preceded the expansion under Boleslav, this defile had been held by the Bohemians, and, consequently, all Polish territory as far north as the hills of Little Poland and as far east as the Bug was under the control of Bohemia. After Boleslav's time this district reverted to Bohemia, and, although the country to the north of the Carpathians remained Polish, the province of Silesia, separated from Poland by a wilderness of sands and woods, detached itself from her politically.

A similar statement is true of the southeastern highway, Red Russia having been in turn controlled by Cracow and Kiev. Only after the power of Kiev had been paralyzed by the Tatar shock in the thirteenth century did Red Russia, linked to Poland by the gateway of Przemysl, steadily gravitate towards the west. Nothing more clearly demonstrates the physical influences at work in Ruthenian history than the fact that Red Russia, located near the Polish gate of Przemysl, became the first district, and for many centuries remained the only district, where Romanism tried to make inroads into the Byzantine see.

The Baltic highway was less dangerous. It possessed no "hinterland" and, accordingly, at first contained no source of danger. But the passage from the broad valley floors of the Warta and Notetz (Netze) to the Baltic Heights was rendered so difficult by the lack of natural ways of communication that only in her most brilliant period could Poland exert an efficient control over that gate. And when, during a period of weakness, she allowed the Knights of the Teutonic Order to organize on the lower Vistula and they allied themselves to the rulers of the March of Brandenburg, which had been erected on the ruins of Polabian Slavdom—then in that very region arose the greatest danger to the Polish state.

### THE LITHUANIAN HIGHWAY

Besides these four, another natural highway, that which linked the north with the south, has played a large part in Poland's history. Even as

[11] The "Moravian Gate," the depression between the Sudetic Mountains and the Carpathians.

early as the time of Charlemagne it had been a decisive factor in the expansion of the Slavs. This is the Lithuanian highway.

The Lithuanians are an Indo-European tribe of the Baltic group, mentioned for the first time by Tacitus under the name of *Aestii*.[12] This people possessed, in its native ability and its favorable location on a long coast line, elements with which to evolve a powerful state. After the Teutonic Knights had settled down and conquered the Prussians, one of the tribes of the same Baltic group, and after the organization of a similar military order on the lower Dvina had suppressed the Letts—still another tribe of that group—the Lithuanians alone saved their independence by quick political organization and by the aid of Ruthenia, a state which at the time was highly advanced in culture.[13] But young Lithuania's geographical position in itself augured well for an immense territorial growth.

Until the end of the twelfth century Lithuania was confined to the monotonous Baltic region and did not extend inland beyond the bend of the Niemen near Kovno where the river issues from its winding ravine (Fig. 5). Having been hard pressed by the Teutonic Knights during the thirteenth century, the Lithuanians at last emerged beyond the valley of the Vilia and took possession of the highroads which dominate the great southern route along the Berezina into the territory of Ruthenia. Thus in a single century, from a small nucleus a great state developed (Fig. 6). The territory of Lithuania before the time of Mendovg (1240-63) covered 30,000 square miles. In the time of Olgierd (1345-77) it covered nearly 250,000 square miles.

The study of the preceding maps leads us to the recognition of a general law. Within the Polish state, and at the stage of its greatest development, there existed a sheaf, as it were, of natural highways, with the heart of Poland for its knot, all of which roads gradually faded away to the east beyond the Dnieper. Poland was the natural link between west and east, that function coming to an end beyond the Dnieper. Here, broadly, ended the territory which aroused in states and commonwealths the impulse known in German history as the *Drang nach Osten*. This impulse, indeed, dominates the entire history of Poland; signs of it are not lacking even in the history of France. The reason for this lies in the general arrangement of the river systems in that part of Europe.

All the rivers in this region, in the lower part of their course, receive practically all of their tributaries from the right, that is, from the east. The basin of the Loire points to a connection with that of the Seine, while the numerous right affluents of the latter direct the expansion of France toward Belgian lands, as witness the Walloons. Farther east the same condition holds true (see Fig. 4): the Weser receives, on the right, the Aller; the Elbe receives the Spree with the Havel; the Oder, the Warta with the

[12] Tacitus: Germania, Chapter 45.

[13] Rozwadowski: The Baltic Languages, *Polish Encyclopedia*, Vol. 2, Acad. of Sci., Cracow, 1915. [In Polish.]

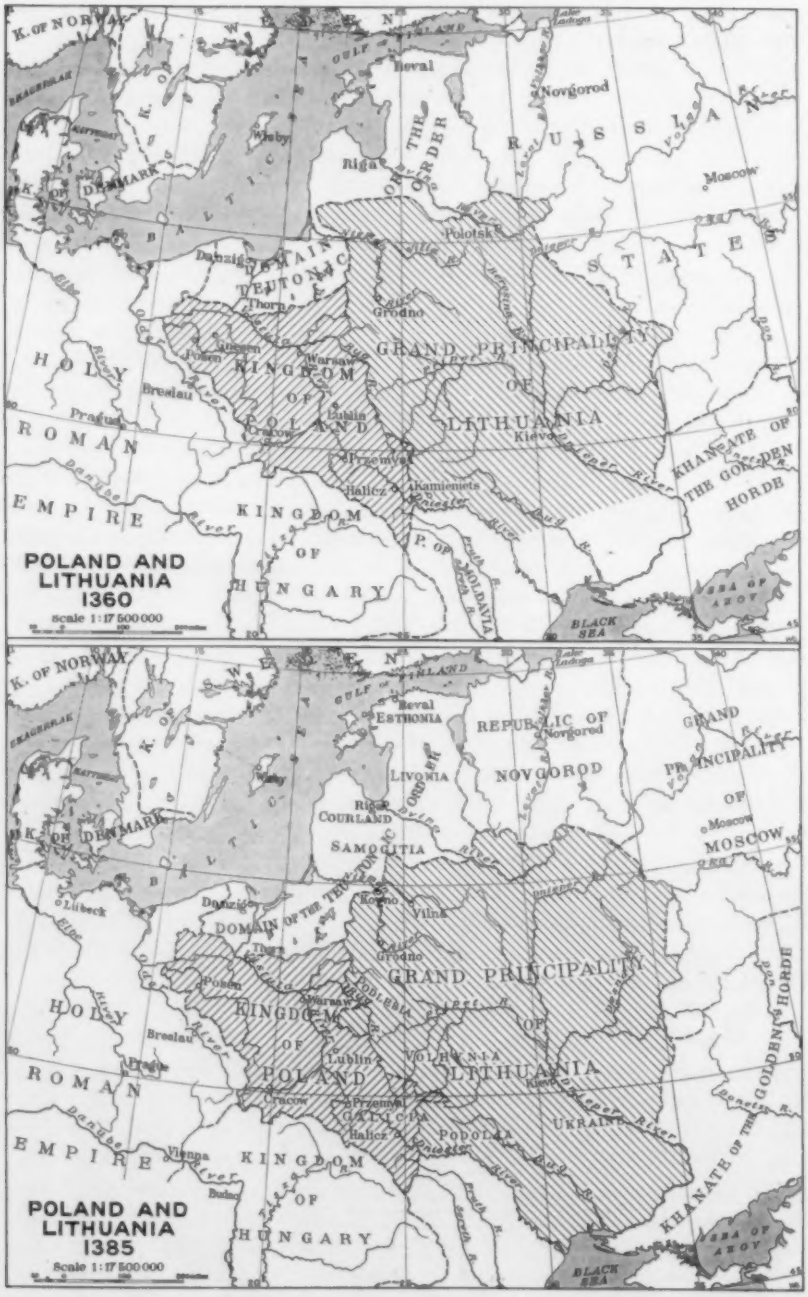


FIG. 6 (upper). Based on Shepherd, Pl. 77.
FIG. 7 (lower). Based on Spruner-Menke, Pl. 69, and Putzger, Pl. 176 and Pl. 196, lower.

Notetz (Netze); the Vistula receives the San, pointing to the Dniester, the Bug, which connects her with the basin of the Dnieper by means of the Pripet, and the Narew, which links her to the Niemen. The Niemen, finally, receives the Vilia, leading on to the Dvina. Beyond the Dvina this arrangement is less conspicuous, while beyond the Dnieper it vanishes altogether.

This brief summary shows that the topography favorable to eastward racial pressure has attained its climax of development in the basin of the Vistula. That the term *Drang nach Osten* is identified more especially with German history is due not to a greater suitability of the German region to this tendency, but, on the whole, to the way in which the German people have utilized it. This tendency has expressed itself quite differently in Poland's history. In order fully to understand the difference, it is necessary to take into account yet another feature of the Polish region and compare it with the history of Russia. Poland, limited on the south by the Carpathians, is not a plane gradually sloping from there to the sea: it is a broad depression leading from west to east, into which the rivers flow in a concentric direction and out of which they flow into both the Baltic and the Black Sea through deeply cut gorges or winding ravines, across the lake-dotted uplands of the Baltic Heights and the broad plateaus that slope down to the Black Sea. The affluents of the Vistula, more numerous from the east than is the case with any of the other river systems to the west, would indeed seem to have assigned to Poland an eastward expansion on a scale impossible in the west, where the lowland belt is narrower. How different the map of Europe might now be had not the Poles been a people whose social and political institutions were directly opposed to the spirit of conquest!

No such physical basis for expansion in one direction only exists in Russia. Here the general character of the land favors an altogether different movement. In contrast to the shallow bowl shape of the Polish region, Great Russia, the core of Russia, may be likened in shape to a flat dome from which the waters of all the great rivers—Volga, Oka, Don, Desna, upper Dnieper, and Dvina—flow outwards, imparting an impulse to the race bred in that cradle to expand in all directions. It is no wonder, therefore, that the Lithuanians, on the one hand facing a physical configuration that threatened them from both north and east and, on the other, open to unobstructed intercourse with unaggressive Poland, tendered a fraternal hand to the Poles and brought about the voluntary union of their two countries, an instance almost unique in history.

### THE RELATION BETWEEN THE BOUNDARIES OF POLAND AND HER RIVERS

Having analyzed Poland's history in the light of the physical features of the land, let us examine the question of her boundaries from the same point of view. Consider, for example, the evolution of Polish frontiers as influenced by the union of Poland with Lithuania. Figure 7 shows the

boundaries at the time of the first (a personal) union. This map illustrates the necessity for that union. It was born of the western danger, the beating back of Poland from the Baltic. This danger was deadly, in spite of the country's open access to the Black Sea, which had lost in importance since the rise of Turkish power. The union became a source of strength that entirely removed the Germanic menace: the Teutonic Knights were beaten and an extended coast line was secured on the Baltic Sea. Figure 8 illustrates this state of affairs. It also shows, however, that wrestling with the western foe had weakened the defense against the eastern danger. In the east Poland established defensive border lines by retiring to two great rivers: the Dvina and the Dnieper. The eastern peril growing, the personal union of the rulers became strengthened by a real union of the two countries (1569). Figure 9 indicates the results: the Baltic coastline is extended, the eastern frontier is shifted far beyond the line of the main rivers, almost to their watersheds. This is Poland's most brilliant picture. The evil omen of decline already appears on the horizon in the form of vassal Prussia, now freed by the will of sovereign Poland.

In these three instances, to which many others might be added, the physiographic law of frontiers is exemplified. Frontiers are, as it were, snap-shots of the life of nations. Being an expression of that life, they can temporarily only, or as a symptom of decay, follow the valleys of main rivers. Main rivers are arteries of national life which cannot, without exposure to fatal blows, be situated on the periphery of a living organism. Hence the vital expansion of a nation always tends to proceed beyond the valleys toward the watersheds.[14]

### THE BOUNDARIES OF POLAND'S PROVINCES AND HER RIVERS

Rivers not only were decisive factors in determining the direction and extent of Poland's expansion as a whole, but also in determining her subdivisions. For, in the lowland area that is Poland, the configuration of the land is in great part dependent on the drainage system. As a consequence there developed a division into the longitudinal zones characteristic of the Polish state. The first zone is the broad belt of the great east-and-west valleys, the cradle and center of Poland, including Great Poland, Cuyavia, and Mazovia (see Fig. 11). The second is the zone of moderate relief which includes the Polish Heights within the arc of the upper Vistula and the foothills of the Carpathians and Sudetic Mountains, that is, Silesia, (see Fig. 10) and Little Poland, and, in prolongation thereof, Red Russia (Fig. 11), the transition ground between Poland and the Ruthenia of

[14] While this law has many historical illustrations and applies with singular force to Polish nationality, it is by no means acceptable as a living principle in the solution of the many involved problems of today. National expansion in the old sense has reached its culmination, whether or not national boundaries correspond to the limits of topographic provinces. The rights of small nations and weak peoples will never again be interpreted through the interests of powerful neighbors and through "laws" designed not to secure international rights but to further national ambitions.—EDIT. NOTE.

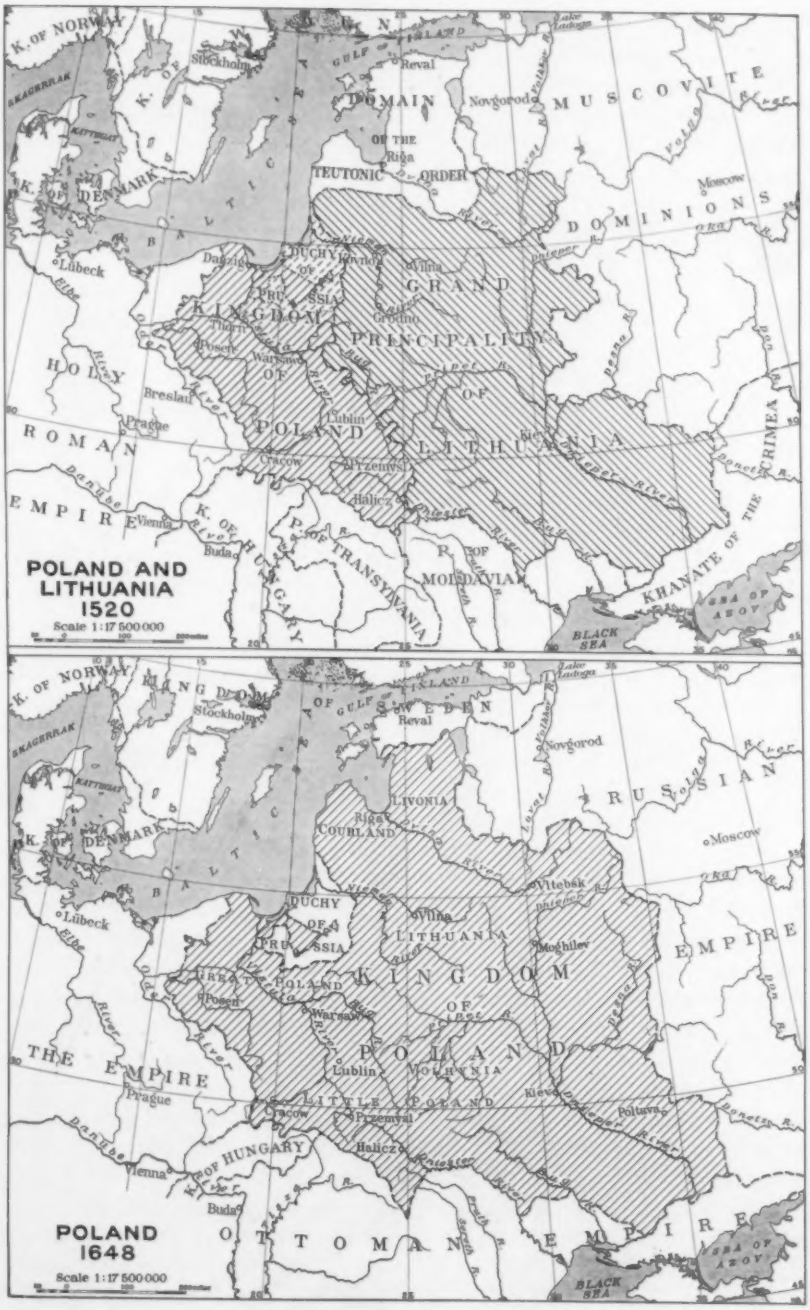


FIG. 8 (upper). Based on Droysen, Pl. 37.
FIG. 9 (lower). Based on Droysen, Pl. 40.

Kiev, as Silesia had been the link between Poland and Bohemia. Finally, the third zone is the coastal region, including Pomerania and Prussia.

These political subdivisions, based on the physiognomy of the country, again reflect the fundamental fact that the main waterways were always the axes, never the border lines, of vital parts of the Polish organism. This is true even for Poland's first period of weakness, when she had fallen apart into numerous separate sections and the rulers of these petty states were fighting one another. Never even in this period did a great river become a border line, not the Vistula or the Warta, nor yet the Notetz or the Pilitza.

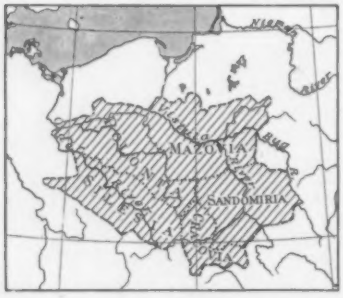


FIG. 10—The subdivisions of Poland in 1240. Scale, 1:17,500,000. Based on Spruner-Menke, Pl. 69, inset.

Furthermore, just as the division and organization of the territory were based upon the character of the land, so did the nation itself draw its racial and spiritual characteristics from the soil. Pomeranian, Polian, Mazovian, Cuyavian, Silesian, etc., are not names derived, as some think,[15] from political terminology; they are the names of Polish tribes, differentiated among themselves by slight peculiarities, but all of them stamped by the individuality of the land. A novel and conclusive argument in this respect has been furnished by the researches of Nitsch, who has demonstrated that the dialectical peculiarities of the Polish language correspond exactly to the division into provinces at the time of the Piast dynasty, and also to the primitive divisions into eparchies.[16]

The dependence of even the smallest units of Poland's political structure on the physiognomy of the land, as exemplified by Figures 10 and 11, is so close that the calamity of the partition appears all the more painful to Polish minds. It not only struck a deadly blow at the state, but, by tearing up the frontiers of districts and autonomous provinces, shook to its innermost foundations the social and economic life of the nation. The boundaries which the various partitions of Poland (Fig. 12) have introduced into the political map of Europe have been destructive and not constructive. Rivers which once pulsated with life have now become merely dead border lines.

The actors in the crime perpetrated upon the Polish nation separated themselves from one another by boundary lines that followed rivers. Assuredly strife would not be long in breaking out again. One can hardly refrain from quoting the words of the poet, who foresaw the part to be played by the river frontier:

[15] K. Kretschmer: Historische Geographie von Mitteleuropa, Munich, 1904, p. 173.
[16] Nitsch, *op. cit.*, p. 319 ff.

The Niemen separates the Lithuanians from their foes:
. . . . . .
On this side throngs of Lithuanian youths
. . . . . .
On the other, in helmet and armor,
The Germans on horseback stand immovable.
Each party watches the crossing.
So the Niemen, once famed for hospitality,
That linked the realms of fraternal nations,
Now for them has become the threshold of eternity:
For none without loss of life or liberty
Could cross the forbidden waters.
(Adam Mickiewicz, *Konrad Wallenrod*)

### THE EASTERN MARGIN OF POLAND

An additional example of the interdependence of geography and history is afforded by the river systems of Russia and Poland.

The importance of artificial waterways and connections has been adequately appreciated only in the eighteenth and nineteenth centuries. In the Russian and Polish lowlands such waterways were of particular moment. The fact that roads could not readily be built, because of the lack of stone, added to the importance of the rivers, and much was done to improve them even in the period of Poland's decline. Still greater improvement has been made upon them by Russia in the nineteenth century. Russia was obliged to try to unite in the most efficient manner an expanse whose very dimensions gave rise to centrifugal tendencies. So much has been done that it is safe to say that all the channels in any way suited to artificial reconstruction have been utilized. Russian waterways can be improved but they cannot be multiplied, at least as far as the main channels are concerned. The Volga is now linked with Lakes Ladoga and Onega and with the Northern Dvina; Lake Onega with the Northern Dvina, the Northern Dvina with the Kama; the Msta, belonging to the same system as the Volkhov (see the maps), with the Volga, the Volga with the Don. The result is that the Baltic and the Arctic Sea are connected with the Black and the Caspian Sea by a system of waterways. Of Polish waterways, the Dnieper is linked to the Dvina, as well as to the Niemen and Vistula. In the same way the Niemen is connected with the Windawa (which flows through Courland into the Baltic); and the Vistula with the Niemen, the Dnieper, and, almost, the Dniester (a project of the famous Beauplan reaching back to the seventeenth century). Thus a second chain of waterways unites the Baltic with the Black Sea. Each of these systems, the Russian and the Polish, are mutually connected, but it will be noticed that they are not joined one with the other. This is no accident, for nature has nowhere provided a convenient channel. This separateness of the two regions has been reflected by the course of Polish expansion, whose natural limit was along the Dnieper-Don watershed.

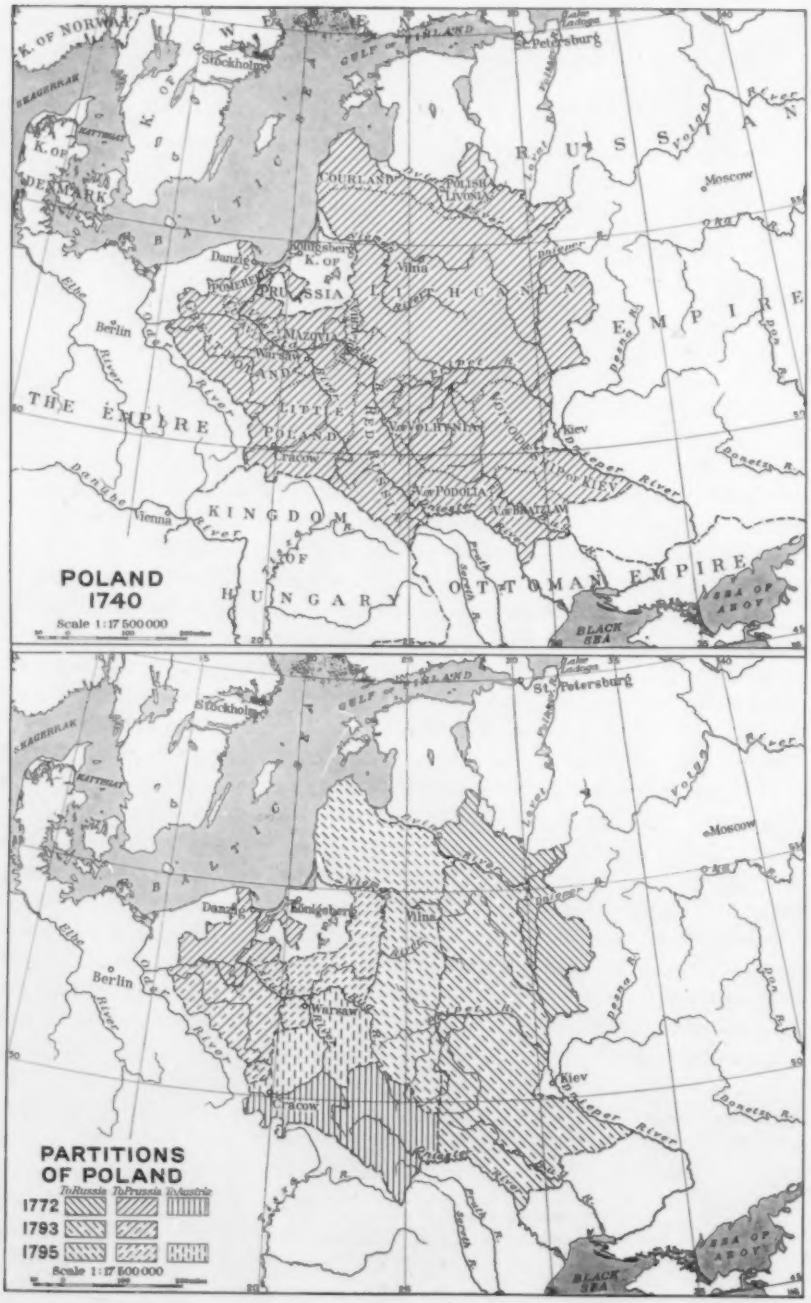


FIG. 11 (upper). Based on Shepherd, Pl. 130-131, and Droysen, Pl. 44.
FIG. 12 (lower). Based on Putzger, Pl. 25.

## The Position of Poland in the European Organism

It seems all the more necessary to dwell upon the distinct physical difference between Poland and Russia, inasmuch as the conception of "Central Europe" has gained ground, especially in Germany. From such a conception it might follow that whatever is not situated in Central Europe belongs, physically, to the great uniform area of Eastern Europe. To show the discrepancy between that idea and the facts is important.

### THE CONCEPTION OF CENTRAL EUROPE A POLITICAL DOCTRINE

The conception of Central Europe originated in Germany, where it became a favorite theme in German political programs. At first, Central Europe was supposed to comprise only Germany, Switzerland, and the original Austrian lands, Galicia excepted (Kirchhoff).[17] Later Belgium and Holland were added, while the eastern boundary was placed at the watershed between the Oder and the Vistula (Penck).[18] To this scheme of Penck, Kretschmer added Denmark.[19] As the bonds of alliance between Germany and the Hapsburg monarchy grew tighter, and because of the renewed compact between the two partners constituting Austria-Hungary, the interest in southeastern Europe of the two Teutonic states was bound to increase. Central Europe, as understood by Partsch,[20] is a thoroughgoing expression of this interest. Partsch regards as belonging to Central Europe, Holland, Belgium, Germany, Switzerland, all of Austria-Hungary, Bosnia-Herzegovina, Montenegro, Serbia, Rumania, and Bulgaria. The extension of this term to cover the territory from the Atlantic to the Black Sea, the exclusion of Denmark and Poland, indicates the political bias of this otherwise thoroughly scientific book. German science also felt this, but could relinquish neither the idea nor its interpretation. In the meantime the danger of a conflict between Russia and Germany kept growing, and the *noli me tangere* which had been so strikingly applied heretofore to Russia's boundaries in all geographical classifications was swept aside by the course of events. Hettner[21] added Poland to Central Europe and, in keeping with Hanslik,[22] tried to fortify this by a new conception, that of "transitional Europe," which considers Poland as belonging to both Eastern and Central Europe. Finally, Banse[23] worked out an extreme definition. He simply discarded the work of the greatest German minds of the early nineteenth

[17] A. Kirchhoff: Schulgeographie und Erdkunde, various editions.

[18] A. Penck: Physikalische Skizze von Mitteleuropa, in "Länderkunde des Erdteils Europa," edited by A. Kirchhoff, Part I, first half, Vienna, 1887, pp. 90-113; reference on p. 94.

[19] K. Kretschmer, *op. cit.*, p. 27.

[20] J. Partsch: Mitteleuropa, Gotha, 1901; also in English: Central Europe, in series "The Regions of the World," edited by H. J. Mackinder, Appleton, New York, 1903.

[21] A. Hettner: Grundzüge der Länderkunde, 1. Band: Europa, Leipzig, 1907, p. 232.

[22] E. Hanslik: Biala, eine deutsche Stadt in Galizien, Vienna, 1909, pp. 1-8.

[23] E. Banse: Geographie, with map, *Petermanns Mitt.*, Vol. 58, I, 1912, pp. 1-4, 69-74, 120-131, ref. on p. 3. See also "Illustrierte Länderkunde," edited by E. Banse, with map, Brunswick, 1914, pp. 67 and 86-87, reviewed in the Jan., 1917, *Geogr. Rev.* (Vol. 3, pp. 84-85).

century—Pallas, Büsching, Gaspari, Kant, Ritter, Berghaus, Humboldt—who had drawn the eastern frontier of Europe along the Ural,[24] and excluded Russia entirely from Europe, creating the conception of "Greater Siberia." Greater Siberia is adjoined to the west by "Central Europe," which, in the east, includes Poland and the Russian Baltic provinces, this "being proven," as Banse puts it, "by their belonging to the sphere of German culture."

Poland, seen in the light of such concepts, figures as the transitional ground between the two great divisions of the Old World, the West and the East. A mass of literature which was to exploit and spread this view sprang up. Even a serious geologist[25] was found who discovered proofs of the "dualism" of Poland, one part of which belongs, like Germany, to Central Europe, and the other to—Greater Siberia!

A historian[26] also appeared who demonstrated that the country between the Elbe and the Vistula, and farther east, which had been the cradle of the Germans, lies in the center of Europe and is therefore good ground for German expansion. It is characteristic that, at the same time, a German linguist[27] set himself to the task of reviving the theory that "what we nowadays call Belgium and Northern France is old German territory" *(Ein alter deutscher Volksboden)*.

But the great world war disrupted the conception of Central Europe as well as the more recent one of "transitional" Europe and "dual" Poland. *Inter arma silent musae.* Science, too, is silenced. For the most dignified voices of Germany's scientific world[28] leave no doubt as to the future trend of the conception of Central Europe, for the names of the Dnieper and the Dvina have actually been mentioned as its eastern limits.

The territorial conception of Poland has been revived by the bloody struggles upon her soil. The concepts of Central Europe, of transitional Europe, and of dual Poland belong to the past: to combat them now would seem futile. This, however, does not prevent us from defining briefly Poland's position in the physical structure of Europe.

## EUROPE'S GEOLOGICAL DIVISIONS

The two most famous geologists of Europe, Suess[29] and De Lapparent,[30] have seen in Europe the features of two intrinsically different worlds: an eastern one, consisting of the Russian tableland, which, through a long course of the earth's history, has remained unchanged; and a western one,

[24] E. Wisotzki: Zeitströmungen in der Geographie, Leipzig, 1897, Chapter VIII: Die Ostgrenze Europas.

[25] A. Tornquist: Feststellung des Südwestrandes des baltisch-russischen Schildes, *Schriften der phys.-ökon. Gesell. Königsberg*, Vol. 49, 1909, pp. 1-12.

[26] Merbach: Slavenkriege des deutschen Volkes, 1904.

[27] ———: Deutsche Orts- und Flussnamen in Belgien und Nordfrankreich, *Zeitschr. des Allgemeinen Deutschen Sprachvereins*, Dec., 1914.

[28] Hofmüller: Russlands Westgrenze, *Süddeutsche Monatsschrift*, Feb., 1915.

[29] E. Suess: Das Antlitz der Erde, 4 vols., Vienna, 1883-1909.

[30] A. de Lapparent: Leçons de géographie physique, Paris, 3rd edition, 1907.

i.e., Western Europe, which was subjected to continual deformations. Taking into consideration the diversity of the latter, Europe may be divided structurally into the following five divisions: uniform Eastern Europe, and four practically parallel zones, the northern, or British-Scandinavian zone, that of the lowlands, that of the central mountains, and the Mediterranean zone. In the geological structure of Europe there is no room for Central Europe.

### THE NATURAL FOUNDATIONS OF EUROPE'S POLITICAL DIVISIONS

In what way did this framework affect the development of nations and the formation of political divisions in the lowland and central mountain areas?

The development of great states in this region and their growth through the absorption or the consolidation of small political communities were mainly conditioned by a characteristic feature of European geography, namely, the existence of two intercontinental seas, a southern, or Roman, and a northern, or Baltic. Between the two worlds which centered about these seas lay an alpine mountain wall. The organization which controlled the breaches in this wall was in a highly favorable position. Two such gaps existed, the Gate of Toulouse, between the Pyrenees and the Alps (broadly speaking), and the Moravian Gate, between the Alps and the Carpathians. A considerable restriction of the continental mass corresponds to these gates; the Bay of Biscay comes near to the Gulf of the Lion, while the North Sea approaches the Adriatic. This increased the importance of these gateways. Still another feature enhanced these conditions: the Baltic turns north near the mouths of the Vistula and the Niemen, opposite the very region where the Black Sea, the innermost inlet of the Mediterranean, penetrates into the continental mass. Thus three isthmuses have developed in Europe: the French, the German, and the Polish.

### POLAND'S ESSENTIAL PHYSICAL ELEMENTS

Poland from the first extended to the Moravian Gate. As early as the seventh century the region was politically organized. The first rays of Christianity penetrated through that gate along with Byzantine civilization. But though the Moravian Gate afforded an easy path across the Carpathians, it led up to an almost inaccessible way to the Adriatic, the passage through the rocky wilderness of the Karst. As a gateway between the northern and southern seas, the Moravian Gate could never compare, even in Roman times, with the convenient passes leading across the Alps. The Brenner Pass, especially, was superior and caused the Adriatic lands to become a region of German political expansion under the Hohenstaufen.

This insufficiency of the Moravian Gate as a southern outlet and the eastward trend of the main affluents of the Vistula undoubtedly account

for the impetus given to Poland's political expansion in the direction of the Baltic-Pontic isthmus. The position of Poland in an area unobstructed by mountains and her equipment with a system of natural valley highways are the basic physical facts which have affected Poland's political existence and development.

## The Physical Foundations of Poland's Union with Lithuania and Ruthenia

It seems pertinent to close this discussion with an explanation of the causes by which Poland, rather than Lithuania or Ruthenia, became the bridge between the two seas. The ice of the glacial period never held Ruthenia in its grip, and consequently this province remained a shelter for all life, including man. Nowhere in Poland are there any remains of paleolithic culture such as are found in Ruthenia. The dawn of history greeted Ruthenian lands, and perhaps the people, earlier than it did Poland. Moreover, it was easy for Byzantine influences to stream into Ruthenia, as the channel was broad and free. Many obstacles, however, had to be overcome by the Romans before they could reach the Poland of the Piasts. Thus for centuries Ruthenia towered culturally above its neighbors, Poland and Lithuania. But in Ruthenia power to organize did not go hand in hand with culture. The reasons were many. The greater part of Ruthenia consisted of steppes. Material life therefore absorbed most of the energy of its inhabitants. Meanwhile the steppe remained open to the incursion of organized hordes. But the steppe culture of Ruthenia lacked strength for a defensive organization. Wooded Poland and Lithuania, however, were able to take the initiative in freeing and defending their countries from invasion—a normal occurrence in the steppe. Although Ruthenia brought culture to Lithuania, especially along the valley of the Dnieper, and although Lithuania remained receptive of Ruthenian culture for centuries, still it was Lithuania that furnished the impulse and took the lead in Ruthenia's political organization.

In addition internal weakness was not wanting in Ruthenia. This country, a level land of steppes, was characterized by a sameness of climate, of natural productions, and of material culture that is uncommon over so large an area. This general uniformity was one of the causes of economic dependence, a feature which was strengthened by the lack of communications. For Ruthenia lies mostly in the region known as the Pontic or Ukraïnian plateau, a strongly dissected oldland from which waters flow in all directions. At the time when Poland and Lithuania, as well as the larger part of Europe, were buried under ice, the Ukraïnian crest of land was gradually rising. Under this slow but steady process, the Ukraïne reached an elevation of 300 to 600 feet, while its rivers cut their channels to a corresponding depth. Cut by wild and deep ravines the land became a roadless labyrinth. It is not strange that Ruthenia, though from time

to time consolidated by the will of some strong ruler into a single state, should always have relapsed, because of its lack of communications, into many independent principalities.

Totally different were the conditions determining the fusion and physiognomy of the lands belonging to Poland even as early as the time of the Piasts. During the glacial period, the ice-cap, as it receded northward across Poland, would halt from time to time; then a deluge of waters would spring forth from its margin and stream down to the North Sea and the Black Sea. This process created not only the east-and-west valleys in Poland's central zone, but also the peripheral highways of the unglaciated region.

It is not strange then that Ruthenia, linked to Lithuania by the artery of the Dnieper, submitted to her politically, even if, at first, she dominated her culturally. Nor is it strange that later cultural centers of Ruthenia, located upon the Ukraïnian plateau, felt the influence of Poland. A wilderness led to the Dnieper, while the fringing ways of communication, such as the Bug, the Pripet, and the Dniester, were all part of the network of Poland's east-and-west valleys.

It is not strange, therefore, that Poland, physiographically varied, should ultimately have attained the highest degree of culture. In control of all the natural highways of Lithuania and Ruthenia, Poland was predestined to become the territorial link of these three parts of a physical unit.

## THE HUDSON BAY ROUTE

By JOHN A. CORMIE

Although the Dominion of Canada is at war and has undertaken to send overseas five hundred thousand soldiers, over four hundred thousand of whom are already in uniform, and although she has manufactured vast quantities of munitions of war and has raised several hundred millions of dollars for the prosecution of the conflict, she has at the same time continued to work on a project which has great historical interest and which promises to be an important factor in the future development of the country. No more romantic undertaking can be found in the history of North America than the long and fruitless search for the Northwest Passage, a search which lured Henry Hudson from Europe for four summers in succession in the early years of the seventeenth century. After he had failed twice, his third attempt brought him to the mouth of the great river which bears his name, and the fourth carried him through the strait which posterity has called for him, out into the sea which Earl Grey called the Mediterranean of Canada and which may become the Baltic of North America. After sailing almost due south along the east shore of the bay, instead of the warm waters of the Pacific he found the marshes of James Bay, where a mutinous crew, having no vision of a new track for the world's commerce, turned him adrift in an open shallop and left him to his fate. The Gentlemen Adventurers of the Hudson's Bay Company, half a century later, followed Hudson's trail through the strait and set up their trading posts in a huge wilderness, which in these days is becoming an empire. Today the people of Canada are building the Hudson Bay Railway, a line over four hundred miles long, from The Pas, an ancient Hudson's Bay Company trading post on the Saskatchewan River, at the edge of the wheat fields of Saskatchewan and Alberta, to Port Nelson on the bay.

The first European colony in western Canada, sent out by Lord Selkirk slightly over one hundred years ago to found the Selkirk settlement on the banks of the Red River near where the city of Winnipeg now stands, sailed through Hudson Strait and Bay; and there is a well-defined opinion that the products of the western farms should follow the path of the first settlers and reach the European market by the short northern route. The steel of the new line is at the time of writing within ninety miles of the port. The greater part of the present summer will be occupied with the building of a large steel bridge over the Nelson River at Kettle Rapids, and the rails will be laid for at least half of the remaining distance before fall. Were it not for the difficulty in securing both men and supplies, trains would be running to tidewater before the end of the current year and the dream of a generation of western farmers would be realized.

When we take into account the toll which the long rail haul to the seaboard at Montreal or New York has levied on the grain growers of the West, we need not be surprised at the steady demand for the new route, which is shorter by one thousand miles than that by Montreal. It has been realized that Port Nelson is practically the same distance from Liverpool as is Montreal, and that a car of wheat on its way to Europe from Regina could be at the port by the time it would have reached Fort William by the other system. Thus the saving is the thousand miles between Fort William and Montreal by rail or the very much longer distance and the double handling of the lake route. From central Saskatchewan and northern Alberta and the new settlements which will undoubtedly be formed still farther north, as, for instance, the Peace River settlements which are already begun, the saving in mileage will be much greater. A glance at the map will show that the benefits which will accrue to the farmers of western Canada with the development of this short road to Europe will be enjoyed by their neighbors in the Western States. The grain country tributary to the Great Northern Railway is several hundred miles nearer Europe by way of Port Nelson than by way of New York.

If one of the results of the war should be the realization of the expectations held by many public men of the Dominion, there will be a very large and rapid increase in the population of the prairie provinces. Principal Oliver, a widely known educator of Saskatchewan, said in a recently published address, "Europe with her war debts, with crippled and disorganized industries, will not be the Europe that but yesterday flaunted the glories of its riches in the face of the whole world. If we had a flood of immigration when Clifford Sifton opened the sluice gates, now will come an avalanche." Lord Shaughnessy, of the Canadian Pacific Railway, has recently given his opinion that, though "bleeding with sacrifice and bending with every effort on behalf of the great Empire of which she is an integral part, Canada's biggest rôle in the play of nations is not now but in the future. Its population is not a fraction of what it should be, of what it is capable of becoming, and of what it will be after the war." Ex-President Taft's remark that "the country is still hardly scratched" is particularly true of the area lying immediately tributary to the Hudson Bay Railway. With the coming of more people, there will be, of course, greatly increased production.

The congestion in the grain elevators and on the railroads ever since the fall of 1915, when western Canada produced the record crop of over three hundred million bushels of wheat, is another condition that must be taken into account in connection with the Hudson Bay route project. With increased population and enlarged crop acreage, the record of 1915 will before many years be far below the average annual yield. The farmers of the West, to use their own phrase, are "getting into cattle." Mixed farming with rotation of crops is now a necessity in the older districts. The

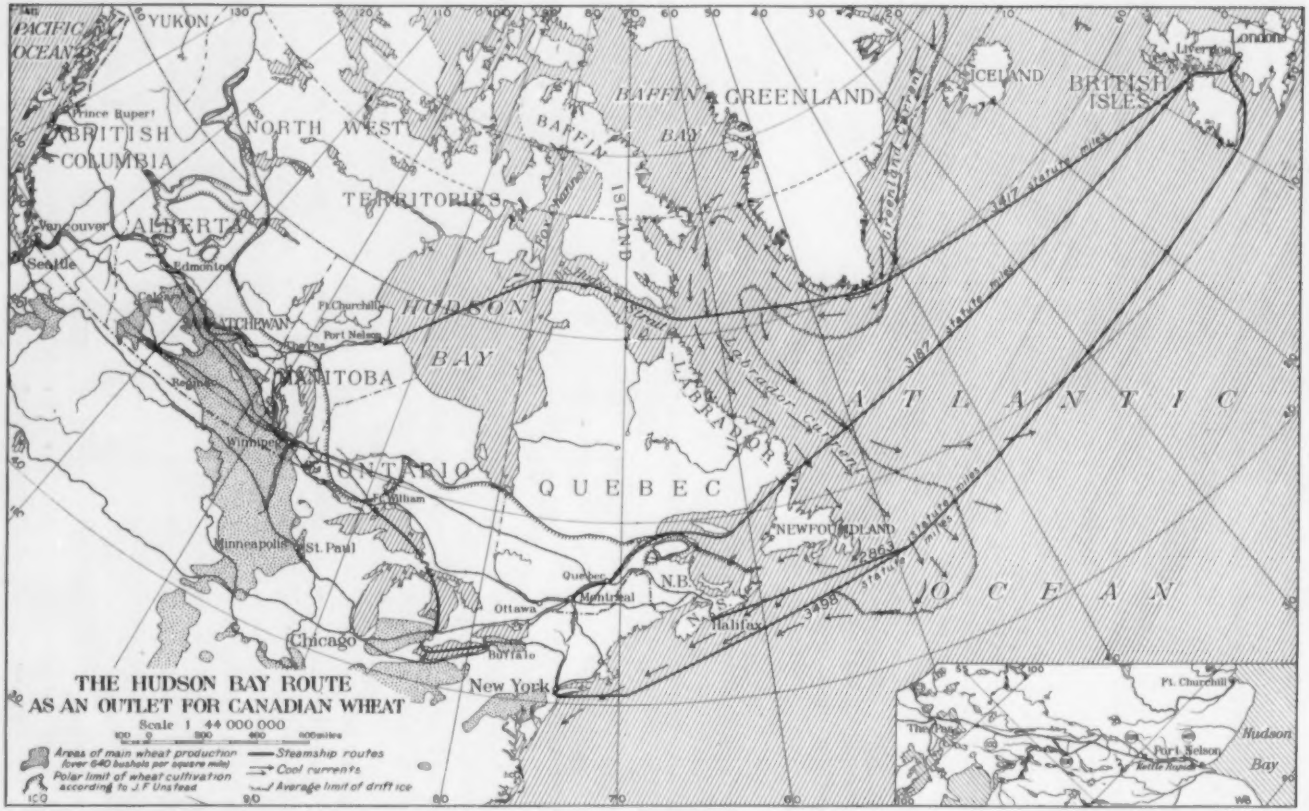


FIG. 1a—The Hudson Bay route as an outlet for Canadian wheat. Scale, 1:44,000,000. The inset, 1:16,000,000, shows the Hudson Bay Railway.

Areas of wheat production based, for the United States, on the atlases of the Twelfth and Thirteenth Censuses of the United States, Washington, 1903 and 1914; for Canada, on the cereal maps of Alberta, Saskatchewan, and Manitoba, published by the Railway Lands Branch, Department of the Interior, Ottawa, 1915. Limit of wheat cultivation according to map accompanying a paper by J. F. Unstead in *Geogr. Journ.*, Vol. 39, 1912.

northern sections of the provinces, with their greater yields of natural hay and the protection afforded by larger forest areas, together with the fact that a short haul of two or three days will bring cattle to tidewater, will more quickly develop mixed farming.

The cost of transporting farm products is now so great that it is declared by agricultural authorities to be the chief cause of the relatively low returns to the industry. This disadvantage increases as settlement proceeds farther north and west. It burns the farmer's candle at both ends, giving him lower prices for his products and increasing the cost of all the commodities he purchases.

These three considerations, the reduction of one thousand miles of rail haul in the distance that now separates the granaries of the West from the Liverpool warerooms, with consequent lowering of the cost of transportation both ways, the prospect of large and rapid expansion in volume of production, and the demands made upon the railway facilities by the present agricultural output, make out the case for the Hudson Bay route, provided there be no insuperable obstacles to its construction and operation.

That there have been and are obstacles in the way of the project is beyond question, but it appears to be equally beyond doubt that they are not insuperable. Perhaps the chief hindrance to the advancement of the work in the past has been the attitude of the great trading companies, notably of the Hudson's Bay Company, to which was given in 1670, by King Charles of England, a monopoly in trade for all future time over all the northwestern part of North America, and whose interest it was to preserve their trading and trapping grounds from the incoming of the white settler. A thick cloud of darkness was accordingly spread over all their territory. This was broken first in Oregon, and the operations of the Adventurers of England have been gradually forced back by incoming settlement, until now the only territory left lies north of the Saskatchewan River. Reputed inhospitable climate and alleged barren soil have been urged as an objection to permanent settlement in districts where today there are thriving communities. Investigation has disclosed the fact that the climate of Manitoba, four hundred miles north of the international boundary, on account of the absence of windswept plains and because of the proximity to the waters of Hudson Bay, the temperature of which is slightly higher than that of Lake Superior, is more endurable than that of Winnipeg. Cultivated strawberries have been matured in The Pas, the southern terminus of the road, and all ordinary vegetables are grown with success at points along the line as far as Port Nelson. Happily the plains of western Canada are now known to be fit habitation for others than Indians and buffaloes, and, in time, the darkness will lift from the great areas north of the prairies.

A second difficulty encountered in building the road was the absence of authoritative maps of the district through which the road was to be

FIG. 1—Hudson Bay Railway survey party moving camp in winter.

built. Apart from a knowledge of the general courses of the Churchill, Nelson, and other larger rivers, there was no reliable information, and knowledge of the details of these river courses was vague. Along the line there are many lakes, but nothing was known of most of them until the surveyors went in to locate the railway, and knowledge of the general topography of the country was in an equally vague state. While the preliminary survey of the railway was difficult and costly, valuable additions have been made to our geographical knowledge of the Dominion.

The lack of settlements along the proposed line was a further difficulty. Apart from groups of Indians, widely separated, with an occasional trading post and mission, there was no settlement and no mode of access but the canoe in summer and the dog train in winter. The railway builders had to pierce this unsettled land, carrying along, with their building material, all supplies of food and fodder for an army of workmen and their animals. The road could not be built in sections, as was done with the recently built National Transcontinental Railway of Canada. It had to be pushed out mile upon mile from the south.

Perhaps the greatest of all the difficulties that lay in the path of the enterprise was the antagonism of influential eastern interests who have the ear of both political parties and have used their influence to prevent the beginning of the work and are today attempting to delay construction, some, indeed, advocating the entire abandonment of the project. A Toronto weekly with a considerable circulation remarked, when the call came for railway iron for the battlefields, that the Hudson Bay Railway might now justify its existence by tearing up its steel and shipping it to France. Some months ago the *Toronto Globe* said: "The opinion among competent judges is that the Hudson Bay Railway is the biggest sinkhole into which the money of the people of Canada has ever been put." This reminds one that the late Alexander Mackenzie objected to the building of the Canadian Pacific Railway on the ground that it would not pay for its axle grease. Happily for the Hudson Bay Railway, as well as for some other matters, the people of the West have reached a point of political influence where they can no longer be ignored, and opposition in other parts of the country cannot prevent the route from being put into operation. The *Manitoba Free Press* replied to the *Globe* by saying: "Malevolent eastern interests may delay but they cannot defeat this great national project, designed to free, to some extent, the western wealth producer from his eastern financial master."

The building of a harbor at the mouth of the Nelson River has not been easy. The drainage basin of the Nelson includes all of the Canadian prairies, the Red River valley in the United States, and Ontario up to a point seventy miles west of Fort William. This means that the Nelson is a very large river. It carries down great quantities of silt, which are deposited at the mouth of the channel, creating extensive sand bars and an

unstable river bottom which will require constant dredging. Although the port will be situated near the fifty-seventh parallel, the large body of water, meeting a tide which rises fifteen feet, keeps part of the mouth of the river permanently free of ice, and on part ice forms to a thickness of not more than ten inches. The controversy over the selection of the mouth of the Nelson as terminal in preference to that of the Churchill appears to be settled. The Churchill has the advantage of a ready-made rock-bound natural harbor of limited dimensions. Its disadvantages are that it necessitated the building of eighty more miles of railroad and would have required a fourth train division, and that over a heavy grade. In the profile maps of the proposed locations, the summit on the Nelson line occurs at Mile 51, and is 920 feet above sea level, or 70 feet above the level of the terminal at The Pas, and from that point down to the sea there is a uniformly level slope. The Churchill route leaves the Nelson route at Mile 102, slopes down to 575 feet but reaches 789 feet at Mile 298 and has several heavy grades between that and the sea. The shipping season will be a little longer at Port Nelson than at Fort Churchill, and there is an unlimited area for a harbor. The cost of maintenance will be more than made up in the difference between the cost of operating a railway on the southern location and that of operating one on the bank of the Churchill River. An island is being built in the deep water at the mouth of the Nelson which will be reached by a steel bridge, and, while engineering mistakes appear to have been made, the experimental stage is past, the most difficult work is done, and the building of a substantial dock is now only a matter of time.[1]

Is Hudson Strait navigable? A railway can be built from the wheat-fields to the bay, the mouth of the Nelson can be converted into a commodious harbor which the largest ocean-going boats can enter, but can the strait be navigated for a period each year sufficiently long to justify the attempt to operate the northern route? On the answer to that question hinges the whole problem. Hudson Strait is a body of water about four hundred and fifty miles long, in width varying from fifty miles to two hundred miles, through which the ice-drifts from Fox Channel pass out into the Atlantic. Through this strait all traffic to and from Port Nelson must pass, and, although the port is six hundred miles from the western end of the channel, its importance as a sea port is absolutely determined by the length of time each year navigation can be safely carried on through the strait.

That the strait is navigable no one disputes. Who penetrated it first is not known, but it is known that Henry Hudson, with a poor little tub of a boat and a mutinous crew, sailed into the bay on August 4, 1610, and that the crew, after casting their master adrift the next summer, went out

[1] For views of Port Nelson and its pier see Fig. 8, p. 444, in the December, 1916, *Geogr. Rev.*, and the illustrations accompanying E. W. Gage: The Hudson Bay Railroad, *Scientific American*, April 28, 1917, pp. 418-419.—EDIT. NOTE.

through the strait and reached home that same year. The following year Admiral Button was sent out by the British Government to search for the lost adventurer. He reached the Nelson River, wintered there, named the port after his first mate, who died during the winter, and returned to England in 1613 to report finding no trace of Hudson. In 1615 William Baffin, whose name lives in Baffin Island, penetrated the strait and was in the open water of the bay on July 3. The Hudson's Bay Company boats have used this northern route to reach their fur posts for two centuries. If these early navigators in an unknown sea, with all the handicaps of little sailing vessels, could safely sail these northern waters, what may not be done with charts, lights, the extension of the wireless system from Port Nelson, a flotilla of ice breakers, and modern steam-driven and steel-clad boats? In 1915 thirty-six passages are known to have been made without mishap.

In regard to the length of time during each summer that navigation is possible, the opponents and friends of the project must content themselves with opinions. There is general agreement that for four months of the year, including August, September, and October, with parts of July and November, the strait can be safely sailed. The late Admiral Markham, who, with Commander Gordon, in 1886, made an investigation, the report[2] of which has never been superseded, said: "It is almost impossible, until more is known of the movements of the ice in the strait, to allot any fixed period. From the general information I have acquired from various sources more or less trustworthy, combined with my own experience, I am prone to believe that Hudson's Strait would be found navigable for at least four months every year, and probably often for five or six months. There will, I have no doubt, be many years when navigation can be carried on safely and surely from the first of June to the end of November." In 1907 an investigation was made by a select committee of the Senate of Canada, on "the navigability of Hudson Bay and Hudson Strait, as an alternative means of communication with the northwestern regions of Canada," since published in a report entitled "Canada's Fertile Northland,"[3] and evidence was taken from men competent to express opinions on the subject. Mr. A. P. Low, the then Director of the Geological Survey of Canada, said[4]: "The strait is navigable from about the middle of July until the first day of November anyway, and a couple of weeks might be

[2] Report of the Hudson's Bay Expedition of 1886, under the command of Lieut. A. R. Gordon, R.N., 131 pp., Dept. of Marine, Ottawa, 1886.

See also A. H. Markham: Hudson's Bay and Strait, *Royal Geogr. Soc. Suppl. Papers*, Vol. 2, 1889, pp. 617-660; and *idem:* Hudson's Bay and Hudson's Strait as a Navigable Channel, *Proc. Roy. Geogr. Soc.*, Vol. 10, 1888, pp. 549-567 [an abstract of the previous item].

[3] Canada's Fertile Northland, A Glimpse of the Enormous Resources of Part of the Unexplored Regions of the Dominion: Evidence Heard before a Select Committee of the Senate of Canada during the Parliamentary Session of 1906-7, and the Report Based Thereon, edited by Captain Ernest J. Chambers. 139 pp. and separate pocket of maps., [Dept. of the Interior], Ottawa, 1907 (reviewed in *Bull. Amer. Geogr. Soc.*, Vol. 40, 1908, pp. 758-759).

[4] *Ibid.*, p. 112.

FIG. 2.

FIG. 3.

FIG. 2—Mile 45, Hudson Bay Railway, looking northeast.
FIG. 3—Bridge over the Nelson River at Manitou Rapids (Mile 242).

FIG. 4.

FIG. 5.

FIG. 4—Western channel of White Mud Falls, Nelson River. Available horsepower of falls, 300,000.
FIG. 5—Portaging canoe, Long Spruce Rapids, lower Nelson River. Note prairie lands.

added at the end, because the ice in Hudson Bay, the new ice, is of no consequence to a ship until it gets to be 15 or 18 inches thick, and not much ice forms before that date." Altogether Mr. Low considered the Hudson Bay route, when it was clear, an even clearer one than the St. Lawrence. There are at least two months when there is no trouble from ice at all. Dr. Robert Bell of the Geological Survey also appeared before the select committee and said[5] that all his trips through the strait were between June 22 and about October 10, and he expressed the opinion that the strait is navigable between these two dates. Dr. Bell said[6] he "did not know any more desirable piece of navigation in the world, excepting the middle of the ocean, and even then a common sailor, who could not take an astronomical observation, could sail through the straits with perfect safety. That was what Henry Hudson's men did after putting him and part of the crew into an open boat and leaving them behind." He was further of the opinion that ocean-going vessels would be suitable for navigation in Hudson Bay and Strait, but in the winter it might be all the better if the ships were protected. Similar testimony in very imposing volume, some more favorable, some less so, is available. The success of Canadian ice-breakers at Archangel has helped to increase confidence in this northern route.

In estimating the value of this new line of communication, it must be borne in mind that, even at the present rate of production, the crop is never out of the country the year it is harvested. Mr. Gutelius, the superintendent of the Canadian Government Railways, estimated that it would take the railways two hundred days to move the crop of 1915. This estimate was unduly optimistic, for part of the 1915 crop was still in the country when the 1916 crop began to come upon the market. With so short a crop as that of 1916, it was estimated that on April 5, 1917, there were still approximately 25,000,000 bushels of wheat in the province of Alberta, 35,000,000 bushels in Saskatchewan, and 12,000,000 bushels in Manitoba. This grain will still be moving east at the time the Hudson Bay Railway opens. Abnormal shipping conditions created by the war must be taken into account, but, as population increases, a smaller proportion of every crop will be shipped out the year of its production. Taking the three western provinces, a comparison of the yearly production of wheat and oats in bushels is shown by means of the accompanying table, published in the *Bankers Magazine* (New York)[7]:

| | *Wheat* | *Oats* | | *Wheat* | *Oats* |
|---|---|---|---|---|---|
| 1907..... | 70,922,584 | 74,513,000 | 1912..... | 196,000,000 | 224,500,000 |
| 1908..... | 96,863,689 | 108,987,000 | 1913..... | 188,878,000 | 208,308,000 |
| 1909..... | 119,200,000 | 163,998,000 | 1914..... | 134,445,000 | 150,474,000 |
| 1910..... | 101,236,000 | 108,301,000 | 1915..... | 370,000,000 | 305,680,000 |
| 1911..... | 169,725,000 | 185,570,000 | 1916..... | 160,000,000 | 232,409,000 |

Consideration must also be given to the fact that the country buys as well as sells, and that the payment of the heavy cost of rail haul to the

[5] *Op. cit.*, p. 117. [6] *Ibid.*, p. 119. [7] March, 1917, p. 265.

stations on the prairies is made by the purchaser. If farm products can be shipped out via Port Nelson and the strait, commodities can be brought in over the same route—must, indeed, be brought in if the project is to be a commercial success. Coal, for instance, as any one living in the Northwest knows, is an important part of the necessaries of life. Mr. M. J. Butler, formerly chief engineer of the Department of Railways and Canals of the Dominion Government, said in his report on this route: "I believe it is practical to lay down coal at Port Nelson from Nova Scotia at a cost not exceeding $3.75 per ton. The rail haul to Saskatoon, as an average point of distribution, need not exceed $4.00 per ton, making the cost $7.75 per ton."

What of the country through which the road is being built? Is there a future for New Manitoba which would justify the construction of this line, apart from overseas shipping?

The oldest industry is, of course, that of the trapper. An army of trappers bring into The Pas, the commercial center of the district, an annual catch of fine fur to the value of $250,000. The manager of the Hudson's Bay Company post at this point, in the days before the railway brought competition, has bought as many as 250,000 musk-rat pelts. All the fine furs, beaver, otter, mink, silver, black, red, and white foxes, are taken in large quantities, and at least two men have begun the industry of breeding silver foxes. The fishing industry, carried on during the winter, has reached considerable dimensions, the catch, consisting of white-fish, lake trout, and pickerel, for the season amounting now to about one thousand tons. Permission was given in 1916 to take sturgeon from the lakes. Owing probably to the clear, cold water of the northern lakes, these fish are not excelled. Considerable areas are covered with spruce, and a beginning of the lumber industry has been made by the Finger Lumber Company, which has established a plant at an outlay of one million dollars, with a daily cut of 200,000 feet of lumber. The amount of pulp-wood has not been estimated, but there are apparently vast quantities of such wood. During the past year much attention has been paid to the discovery of mineral-bearing rocks in the western flange of the "Great Canadian Shield" over which the railway runs. In northern Manitoba these rocks cover an area approximately 140 miles in length and 25 miles in width. Near Mile 86 on the railway gold has been discovered, and mining operations have been begun on three claims. The ore is gold-bearing quartz, and the first car recently shipped out, which was in the nature of a test, was treated in Trail, British Columbia, and the returns are said to be satisfactory. Farther east than the goldfields, at a point almost on the boundary between Manitoba and Saskatchewan, copper ore has been discovered in two bodies, one of which is very large. Operations have been begun on the smaller of these bodies, and during the past winter 3,600 tons of ore have been taken out. This ore contains 22 per cent of copper, and there are also iron

and some zinc. On the larger of these bodies of copper ore the work of drilling, with a view to determining its size, has been carried on for several months. It is not possible to say more about the mineral outlook of the country, for the reason that there has been little prospecting, but the rocks are of the same geological age as those at Cobalt and Sudbury in Ontario, and mining engineers have said that the future of the mining industry of New Manitoba is very bright indeed. Power from many rapids and waterfalls may play a large part in the development of this industry.

Is there an agricultural future for the district? For the first ninety miles of the railway line, the country is low and swampy and covered with moss. Under the moss is heavy clay, carrying many glacial boulders. Nothing can be done with this land until it is drained, and it is doubtful if much of it can be drained. For fifty or sixty miles farther the country is rocky, and what soil there is, is too shallow to be of any use. Beyond this, the railway enters the so-called "clay belt," indicated on the map of the Geological Survey as containing about 10,000 square miles. Many opinions have been given as to the value of this land for agricultural purposes. Mr. J. B. Tyrrell, a witness before the Select Committee referred to above, expressed the opinion[8] that there is "a magnificent stretch of country there and it extends westward along the Churchill. These lands north of Lake Winnipeg are clay lands, an extension of the same basin as the Manitoba clays." Mr. Tyrrell said he believed that that country, while a little harder to be settled, and not so productive to settlers who are looking for farms ready-made and cleared for them and ready for planting to wheat, will be as fine an agricultural tract of land as there is in the northwest. Mr. William McInnes, geologist of the Geological Survey, said[9] that "after leaving Split Lake, ascending the river, this clay-covered country shows absolutely no boulders and no gravel. . . . There is absolutely nothing to interfere with the cultivation of the soil there. It is a country that has been burnt over. . . . It has been subject to repeated burns. At the present time, it is covered by a very open forest. Grasses grow fairly luxuriant." Mr. McInnes said he did not mean to say that all of that 10,000 square miles was good land, but the basin characterized by this deposit of clay has an area of about the size mentioned. During the summer of 1910 an inspection of timber was made by J. R. Dickson, Assistant Inspector of Dominion Forest Reserves, along the proposed line of the Hudson Bay Railway. He traversed part of the clay belt and reported[10] that it "contains upon the whole from 50 per cent to 75 per cent of arable land and probably has a good agricultural future. The soil is exactly similar to that around Cochrane in New Ontario, which yields such

[8] *Op. cit.*, p. 90. [9] *Ibid.*, p. 65.

[10] J. R. Dickson: Report on Timber Conditions, etc., along the Proposed Route of the Hudson Bay Railroad, *Forestry Branch Bull. 17*, 27 pp., Dept. of the Interior, Ottawa, 1911.

large returns under right treatment." In order to make a practical test of the climatic and soil conditions of this land, the Department of Agriculture of Manitoba, in the spring of the current year, opened up a small experimental plot, no returns of which have come to hand. While it is true that there are gardens wherever there are permanent residents, at Hudson Bay's Company posts and missions there is no farming, and it remains to be seen whether or not the greater proximity to tidewater will give these lands a value that will make them rivals to the more open lands on the prairies, of which there are still vast quantities unoccupied. Dr. John McDougall, quoted by Major Chambers in "The Unexploited West,"[11] says the district, "though wooded to a considerable degree, is a far more enticing agricultural proposition than that which faced the early settlers on the bush farms of Ontario and the eastern provinces fifty years ago." The day will undoubtedly come when a large agricultural community will be found in New Manitoba.

Apart from the possibilities of agricultural development in New Manitoba, created by the successful operation of the Hudson Bay Railway, there is a large territory in Saskatchewan lying north of the great river which has given its name to the province and a still larger area along the upper stretches of the Peace and Mackenzie Rivers, where development is retarded by the lack of easy communication with the world's markets. Mr. Tyrrell, speaking of means of communication with the Peace River country, said: "If the Hudson Bay route was opened, it would be very much better than that—shipping to the European markets via Pacific ports. It would be very much shorter and a great deal of time would be saved. The people of Athabaska would be as much on the front as they are at Fort William."

Taking a very much larger view of the problems of communication and examining the broad question of the transportation of the world's supplies, it may be held that Hudson *did* make the great discovery. He was searching for a short route from England to the rich markets of China, and he died somewhere along the shores of the bay in disappointment at the apparent failure of his quest. He may not have failed. From England to eastern Asia via Suez is a distance of about 16,000 miles. By way of New York and San Francisco it is about 11,000 and by way of Seattle or Vancouver about 10,000, but by way of Port Nelson and Prince Rupert it is less than 8,000, and, to use the language of the North, "the portage" from Port Nelson to Prince Rupert is much shorter than that on either of the other systems. Posterity may credit Henry Hudson with success.

Comparison of the cost of building the railway with that of other enterprises to which the Canadians have set their hand should be made. The

[11] The Unexploited West: A Compilation of All of the Authentic Information Available at the Present Time as to the Natural Resources of the Unexploited Regions of Northern Canada, by Major Ernest J. Chambers. 361 and xxxiv pp., [Dept. of the Interior], Ottawa, 1914. Reference on p. 37.

St. Lawrence channel has cost the Dominion Government about $38,000,000. A harbor is being built at Toronto at an expenditure of $20,000,000, and the reconstruction under way of the Welland ship canal will cost $50,000,000. The estimated cost of the Hudson Bay Railway, including the terminals at The Pas and Port Nelson, is $26,000,000. If for four months each year the transportation of the western crop can be expedited by having the distance to Europe reduced by one thousand miles, it is probable that the grain growers will insist that no obstacles be placed in the way of an early completion of the line. "Nothing but an actual test will ever prove which opinion about the northern route is right. The believers in the route await that test with absolute confidence."

# NATURE AND MAN IN EASTERN PARÁ, BRAZIL

By EMILIE SNETHLAGE
Museu Goeldi, Pará

Colonel Roosevelt's remarkable and hazardous journey in 1914 brought home to many a realization of the fact that large expanses of territory in South America are still unknown. Among these the largest are in the Amazon Basin; and, strange to say, they are located in the middle and lower rather than in the upper sections of the basin. The reason is that the upper part of the basin is a vast lowland in which the rivers flow with little change in gradient and are navigable for steamers or launches almost up to their headwaters, where there is connection, by well-known trails, to the dense populations of the Andean plateaus and the trade routes of the Pacific. By contrast the lowland area in the lower, or eastern, part of the basin is restricted by the close approach of the Guiana and Brazilian Highlands, which leave only the extreme lower courses of the tributaries of the Amazon open to steam navigation, while their upper courses are interrupted by rapids and falls. Many of the main rivers have been visited by scientific explorers only within the last twenty-five or thirty years: in the north, the Trombetas by Coudreau in 1899, and the Jary and the Parú by Crevaux in 1877-79; in the south, the Tapajoz by Coudreau in 1895-96, the Xingú by von den Steinen in 1884, and the Araguaya and Tocantins by Ehrenreich in 1888. But the spaces between the rivers have remained to a great extent *terra incognita*. The cross-country exploration of Farabee[1] in the hinterland of British Guiana and between the Tapajoz and the Xingú is the latest piece of pioneer exploration in eastern South America and is worthy of comparison with the best of the earlier expeditions.

A good illustration of how little is known about the interior of northern Brazil even near centers of population is the region immediately to the east of Belem, or Pará, a city of more than 100,000 inhabitants, the terminus of the only railway in the state of Pará, and a sea-port of the first rank, where the trade and navigation of the whole enormous Amazon Basin are concentrated. We have frequently been asked by naturalists, who were in receipt of botanical or zoölogical specimens from this region, about the location of the places mentioned on the labels of the specimens, "because we cannot find them on any map." In fact, though some of these places are quite considerable, not even the official map of the state, re-edited at great cost in 1908, shows them. Take for instance the region east of Pará, traversed by the Pará-Bragança railway. Not even the names of all the stations are given. The coast is the region best known and in consequence

[1] See the February *Review* (Vol. 3, 1917), p. 149.—EDIT. NOTE.

best represented. Nearly all the small coastal rivers have their courses fairly well marked. To the south, however, the map is less explicit. The names are also given of the larger affluents of the Guamá, the main artery draining the hinterland, but as to the tributaries, only a few of which are delineated, the map becomes silent; and with the exception of the small cities and market-places on the coast, some of the railway stations, and about half a dozen *povações* on the Guamá and the Caeté, the name of no locality is given. Yet the region between the coast and the Guamá, divided by the railway into two parts of about equal size, is fairly well populated and is considered to be one of the most advanced and best cultivated of the state. It is interesting in many respects to the scientist also, forming, so to speak, a compound of nearly all the most important features, ethnographical as well as geographical, of Amazonia. Besides persons of mixed descent, of all shades and colors, full-blooded representatives of each of the principal three races that make the modern Brazilian are quite commonly seen, and in remote places representatives of the Indian component are still living in their old haunts.

Even now by far the greater part of the country is covered with majestic and interminable virgin forests. It contains, however, vast *campos* in its eastern part, where stock-raising flourishes. Near the coast and along the larger rivers one meets large wooded swamps, *igapós*, while away from the latter the gradually rising land, the never swampy *terra firme*, occasionally even forms insignificant hills and ridges.

To the naturalist the difference between the highland forest, the *matta virgem da terra firme*, and the swamp woods, the *igapó* (of which the *várzea*, the country swampy in winter only, is an important variety) is of great significance, and it is my conviction, after a ten years' stay in the country, that it serves even better than the more generally known difference between forest and *campos* to elucidate the question of local races and geographical subspecies in the animal world.

If you take the train at Belem for Bragança, you will not see much of the virgin forest, at least in the first half of the 180-mile journey, and nothing at all of the *campos*. For in the beginning the railroad is bordered principally by *capoéira* and only occasionally passes through insignificant patches of wood, *igapó* most of it, near the rivers. The *capoéira*, appearing generally as a sort of low, extremely tangled shrubwood, invades the abandoned *roças* (plantations) in a very short time, the latter being cultivated, after the Brazilian fashion, for several years only, or as long as the soil retains its natural fertility. Then the impoverished land is left to itself and produces a characteristic shrub-vegetation, presenting in its dwarfed and somewhat meager though tangled appearance the greatest imaginable contrast to the giant, majestic growth of the *matta virgem da terra firme* or the tropical exuberance of the *igapó*. In these *capoéira*-covered stretches the plantations themselves no longer play a conspicuous part, as was the

FIG. 1.

FIG. 2.

FIG. 1—The Franciscan mission of São Antonio do Prata, about one hundred miles distant from Pará, Brazil. (Photo by E. Snethlage.)

FIG. 2—Hut of a half-breed Indian hidden among banana trees. (Photo by E. Snethlage.)

case ten years ago, the land near the railroad having been cultivated first and being now abandoned and overgrown with shrubs.

From the station Igarapé-assú onward—about halfway between Pará and Bragança—the country takes on a more picturesque look, the road leading alternately through *terra firme* and extensive swamps, both richly wooded. The *campos* remain hidden to the left. They are most extensive on both sides of the little coast river Quatipurú, but separated from the railway by a girdle of forest land of more or less considerable width. They are interrupted by wooded stretches of land, called *tesos*, and by gallery-woods bordering the rivers, representing a special forest-formation, related, however, to the *igapó*.

I wish, however, to introduce the reader to the typical virgin forest, and so we leave the train at Igarapé-assú and turn southward to the water-shed between the coast rivers and the affluents of the Guamá, whose head-waters intermingle in a very complicated and curious way. About 12 miles to the south, at the confluence of the Maracanã, one of the more considerable coast rivers, and the Rio do Prata (which is not to be found on any map), an Indian mission was founded some twenty years ago by devoted and hard-working Franciscan monks and nuns of the order of Santa Clara. The tribe whose conversion was to be undertaken is a branch of the Tembé Indians, who though remote from the settlements of white men had lived in quite good relations with them for some generations, as their semi-barbarian kindred in the Capim and Guamá districts do even to this day. The mission, however, soon also became the center of a considerable colony of Cearenses, inhabitants of the state of Ceará, who had fled from that terrible scourge, the *secca*, or drought, so impressively described by Herbert H. Smith.[2] The mission and colony of São Antonio do Prata, as it is called, presents quite an agreeable aspect, with its little church in the Italian style (the monks are most of them Italians, while the nuns are all of Brazilian descent), its stately convent, and the attractive building which the monks constructed for themselves only a few years ago. The erection of the buildings is in fact all their own work, as is the laying-out of the fields and the cultivation of many of the plantations and orchards. In recent years the mission, like all enterprises in Amazonia, has suffered considerably from the rubber crisis, though the government subsidizes the institution and does its best to help the devoted monks to get on with their useful educational work. The mission now serves partly as an orphanage; more than sixty children are being educated there, the number having been much larger formerly.

When I first came to Prata, ten years ago, the nuns' house had only just been finished. Services were held in one of its rooms, and the monks lived with their pupils in rather primitive sheds. Large and beautifully kept plantations surrounded the place on all sides, and there was a hopeful and

[2] Brazil: The Amazons and the Coast, Scribner, New York, 1879: Chapter XIII, "Ceará and the Drought."

prosperous look about everything. Now the new and stately buildings of the church and monastery rise from the middle of the *capoéira*, the former plantations having long since been abandoned. This gives the place a somewhat desolate appearance at first, well in accord with the nearly universal depression caused by the crisis. Yet, on close examination, the case of São Antonio do Prata is not at all hopeless, and I trust it may prove to be a first instance of the better future that awaits the Amazonian region when the crisis has passed. Following the newly laid-out roads, lined in part with beautiful, shady mango trees, we come, after a quarter or half an hour's walk, to the new plantations, and find that, beside the old inhabitants, a number of new agricultural colonists have settled there, each having built his *barraca* (hut), in the middle of a large, newly planted *roça*. Rice, Indian corn, sugar-cane, beans, etc., are producing rich crops, which are brought to market by means of a small field-railway, constructed by the monks, but now run by the government as a branch of the E. F. B. (Estrada de Ferro de Bragança).

The virgin forest, which some years ago still surrounded the place quite closely, has now retreated a good deal. To the northwest, where the *igapó* of the Rio do Prata and the hills of the watershed make farming impossible, the forest may be reached in a twenty-minute walk, and from there it stretches away almost indefinitely, covering hills and valleys with its deep green shade. Wandering, as we safely may, thanks to the compass we have with us, the whole day long under its leafy vault, we are impressed anew with wonder at the enormous expanse of the Amazon forest. Weeks and months may be spent in this same interminable woodland, on the banks of the Tocantins, and in the region between the Xingú and the Madeira, from which its green waves still sweep on to the west, surging up and covering the first chains of the Andes, only to be stopped by the bleak winds of the *páramo*.

As for scenery, the cultivated land and even the *capoéira* have their beauty, too, especially as they are generally intersected with remains of the high forest and lovely little valleys, abounding in palms and traversed by clear brooks. The picturesque *barracas* of the colonists or the indigenous Tembés are hidden under large-leaved bananas, and the crimson flowers of the beautiful hibiscus, which the *caboclos* like to plant in their little gardens, inject a vivid element into the flood of green which is the characteristic of the virgin forest as well as of the *capoéira* and the plantations.

But perhaps its loveliest sights the Amazonian forest reserves to the canoe traveler in the upper courses of the small coastal rivers or of the Guamá affluents. All the showy plants which, to the inhabitant of temperate climates, appear as the incarnation of tropical beauty and exuberance, are crowded together here. They receive just enough light to force them to arrange their foliage to the greatest advantage—which, at the same time, means greatest perfection of outward appearance, as almost always

in nature. There are delicate ferns and large-leaved aroids, spreading their brilliant green shields around the overhanging stems in the most artistic manner possible. Palms lift their graceful heads on slender stems or curve over the brown-golden waters, their feathery crowns forming the centerpiece of a bewitching picture, set off by the tangled mass of vegetation behind. Every bend of the river (and its bends are innumerable) discloses a new view of ever like, yet ever changing beauty. Animal life, apart from the tiny or noiseless creatures that escape the eye of the non-zoölogist, is not so abundant near the river banks as is the vegetation. Kingfishers of different species, noisy and showy birds, play the most conspicuous part. Flocks of parrots and parakeets settle screaming on the top of some fruit-bearing tree, and occasionally a humming-bird darts rapidly from shore to shore. The gorgeous *Topaza pella* is not at all infrequent on the Maracanã and its affluents, though it rarely appears in the full glory of its glittering array of golden green, purple, and ruby, these colors only flashing out under special conditions of light and shade. Occasionally a band of capuchin monkeys may be heard chattering in the distance, or the pretty little squirrel-monkey skips along the tree-tops bordering the banks. Sloths are to be met with, too, climbing or feeding lazily among the leaves. But nearly all the larger inhabitants of the woods, the *anta* (tapir), the wild hogs, the larger felines, etc., have disappeared long ago or become extremely shy and rare.

When the mission was founded, the region between the headwaters of the Maracanã and its affluents, the Rio do Prata and the Rio Jejú, was inhabited by Indians of the Tembé tribe, and to them in that time the work of the mission was exclusively addressed. The monks and nuns soon won the confidence of the peaceful Indians, and nearly all the principal people among them sent their children to be educated at Prata. I have often been struck, not only in this case but in others, with the response which the temperament of the Indian makes to the monotonous regularity, combined with the brilliant outward show, of Catholic religious life in such places as these. The children apparently enjoy the ever-repeated walks to church for prayer and the glorious spectacle of the mass. The altar, covered with costly embroidered linen, decked with artificial flowers and shining images and vessels, never fails to impress them. However, the children's life in the monastery is not wholly taken up by religious practices. After the regular school work, which occupies the morning, the girls are taught all sorts of house- and needlework. Under the guidance of specially trained nuns they provide for the *gallinhéiro* (poultry-yard) and the garden, where beans, Indian corn, sugar-cane, and batatas are grown. Thus their education is many-sided and practical.

It is the same with the boys. Under the monks' supervision they till the land and plant it, bring in the harvest, and help to prepare it for home consumption and market. The planting of rice—wholly neglected in Ama-

zonia for a long period, as were most of the other purely agricultural practices, in consequence of the more profitable rubber-gathering—has again been taken up here in Prata. The first modern machines for threshing and cleaning the grain were set up and worked, and thus a wholesome impulse was imparted to the whole country around. Cattle were introduced and throve much better than in most other places, apart from the *campos*. The work of the *religiosos do Prata* has proved really advantageous to the whole region, and it is to be hoped that the relatively insignificant means for its successful continuance may always be forthcoming.

There are still a number of full-blooded or nearly unmixed Tembés living near Prata, their center being now the headwaters of the little Rio Jejú, an affluent of the upper Maracanã. In 1905, on the occasion of my first stay at Prata, I was formally invited to visit the *tushaua's maloca*, which was to be reached only after many hours' walk through woods and swamps, with the help of a guide. These half-civilized Indians still cling to the thoroughly Amazonian custom of hiding the approach to their houses in a most elaborate manner, by making the footpaths nearly invisible (at least to the non-Indian eye), by introducing unexpected turnings just at the least conspicuous part of the road, and sometimes even by inserting a gap of forest, so that the exit may be found only by the initiated. The *tushaua*, Capitão Joaquim Braz, received me cordially. His spacious *maloca* was thatched with palm straw, and the walls of the one perfectly closed room in the otherwise open building consisted of the same material. *Farinha*-making was just going on, and I was shown the process. The manioc root is first soaked in running water in a special recess of the little brook near the house, then peeled and triturated on a special instrument, the *raladór*. The yellowish mass resulting from this is then put into a *tipity*, a long, tightly plaited basket of palm fibers, which is slung to a beam of the roof and stretched to its utmost possibility by a stone suspended on its free end. The pressure thus produced draws out the poisonous juice still contained in the mass and helps to dry it. Several hours' roasting over a slow fire in a large metal basin with continual stirring completes the process, whose final product is the white or yellowish *farinha d'agua*, the principal and most necessary food of the Paraense, be he Indian or Brazilian. Standing for hours near the fire roasting *farinha* is no easy work in this hot climate. No wonder that the Tembé, though long accustomed to clothing, throws off every dispensable garment on this occasion—as on many others.

In recent times, and principally through the influence and example of the monks, many other cereals and vegetables have been introduced, especially rice and *feijão* (beans). To the original Tembé—who is now fast disappearing—however, the manioc field was and is the chief resource, and so it never is far from his palm-straw hut. There is a marked difference, characteristic of the racial temperament, between the surroundings of the indigenous Indian hut and of that of the Cearense colonist. The latter

likes to build his house in an open place, right in the middle of his *roça*, or in front of it, beside the road. The Indian, however, prefers to have it in the woods, making his *roça* at some distance, even on the opposite shore if he lives on a river bank. Part of the *roça* is nearly always planted with *iniam, batata doce* (sweet potato), *macacheira*, and other indigenous roots; and some Indian corn and sugar-cane as a rule are cultivated, the latter being pressed in a rather primitive machine, with the help of a large wooden wheel, and the juice turned to *garapa*. Bananas are scarcely ever lacking, but they are generally planted in the vicinity of the huts. They are, to my mind, among the greatest beautifiers of the tropical landscape and, with the dense crowns of the *pupunha* palms *(Guilielma speciosa)*, whose orange-colored fruits are likewise edible, the large acanthus-shaped leaves of the *mamão* tree *(Carica papaya)*, and the feathery *assahy* palms *(Euterpe oleracea)* near the brooklet in the background, help to make a charming picture of many an Indian home. There is besides the beautiful *miriti* palm *(Mauritia flexuosa)*, whose enormous, fan-shaped leaves overhang the washing-place where the good Indian housewife cleans the family linen, in rather primitive fashion, to be sure, leaving the brunt of the work to the bleaching power of the sun.

I wonder whether the drinking of *cashiri*, that unappetizing but most general of Indian beverages, is still in vogue in any remote district among the Tembés. I have found no trace of it among these Jejú Indians. They seem to be quite a sober race, the famous *assahy* wine, drunk here as in the whole Amazonian region, containing no alcohol.

Hunting still furnishes the Tembé part of his animal food. Though the tapir has become very rare in these parts and the two species of peccary are disappearing, many a *veado* (roe) still comes in the hunter's way, and harelike *cutias* (agutis) abound, while the rarer *pacas* and *tatús* (armadillos) form a more delicate article of fare. Even the sloth is not at all disdained by the indigenous. Fishing gives good results in many of the small rivers and is still largely practiced by means of the Indian *cacury*. Most of the river-fishes like to enter the smallest affluents, the *igarapés*, at high water. These affluents are then shut off from the main river by a deeply implanted wooden fence that cannot be passed by the returning fish, which are caught by the Indians when they want them. Small and rather shallow dugouts are used by the Tembés. They are of a more elaborate and elegant make than the *ubás* of the more western rivers, being pointed at each end, and they contrast favorably with the heavy and clumsy boats of the colonists. The rivers being shallow during the greater part of the year, these boats are generally pushed forward by means of the *vara*, a long pole, while a large paddle is used for piloting. Paddles, however, are used at high water and in winter. They are rather short, but long-bladed, as compared with the rudder and with the small round-bladed paddles used on the Amazon.

Of the domestic animals kept by the Tembés, a peculiar race of lean, short-haired dogs deserve to be mentioned first, as they are extremely noisy and sure to give the first welcome, most often in a rather hostile manner, to any stranger approaching the *maloca*. Then there are fowls and ducks and turkeys and pigs, bred from time out of mind, that is, before the mission was founded and time acquired a meaning for these children of the forest.

Clothing, too, was already known to these Indians when the monks appeared, and the national *tanga* and the pretty feather ornaments had already vanished. Instead of the bow and arrow the *musquetão*, a muzzle-loader, was in vogue (incidentally, that antiquated weapon is still beloved and preferred to the modern rifle by many a *caboclo* of the interior), and the Iron Age, with its *terçado* (large wooden knife) and *machado* (axe) had already succeeded the Stone Age. I do not know whether pottery ever has played an important part in the lives of these Indians, as it has with many of the tribes living on the larger rivers, where clay is abundant. The vessel of indigenous manufacture most largely in use at present is the *cúya*, made in all sizes and sorts—large ones from the shell of the *cuiero* fruit, small ones from several sorts of gourds. Baskets and mats also are remains of indigenous handicraft, and many of the hammocks are even today of the old Indian make, knitted from palm-fibers.

The Tembé language is still spoken by most of the adult Indians and by some of the younger generation, too, but it is disappearing. It is a dialect of the widely spread Tupy-Guarany, from which the *língua gerál* is derived. Though it is but natural that the ethnographer's attention today is chiefly concentrated on the fast-vanishing tribes in a completely wild state, it seems a pity that these semi-civilized tribes are not more intimately studied.

Only the naturalist who has lived for years in the country and come into intimate contact with all classes and races and knows the conditions of life in Brazil can appreciate the multitude and the importance of the cultural and racial problems that still require solution. The curious blending of three races has left deep traces, not only on the outward appearance of the people, but also on their costumes, plays, and folk-lore. I spent part of June, 1915, in Prata. Every Sunday and holiday, at night, a peculiar musical noise (it hardly could be termed music in our sense of the word), drumming and trumpeting on strange instruments, interrupted by monotonous chanting, was heard, and a curious procession of men and boys clad in fantastic costumes with hats of flowers or crowns of feathers, some of them painted black or red, marched around, leading about a rather coarse imitation of an ox and from time to time performing a sort of pantomime that invariably ended with the killing of the ox *(matando o boi)*. That was the famous *boi-bumba*, the popular summer entertainment of the Amazonians. Even in the capital, the *boi-bumba* is a favorite spectacle with the lower classes, and its noise is often enough heard from afar in

the main streets and open places of the suburbs. But as it is rather looked down upon and proclaimed as shocking by the educated people, it really has somewhat degenerated, and the opportunity to study it is not very favorable. In the country, however, it still has the character of a legitimate popular festival, most interesting from the point of view just mentioned, as showing elements evidently belonging to all three Brazilian races. I shall not attempt here to give a thorough history or explanation of the play, which indeed has never been tried, so far as I am aware. However, relics of Indian and negro superstitions are distinctly traceable in it, and the whole has been modified, as is so often the case, by the highest of the three races. This may be inferred from the time at which the pantomime is performed, being St. John's day in Amazonia, and the Epiphany in the south of Brazil.

## EUROPEAN WAR MAPS

The maps to be used in studying the military campaigns of the present war in Europe may broadly be divided into two classes, detailed topographical maps, and general maps. The former embody the large-scale official surveys of the various belligerent countries, while in the second class may be grouped the smaller-scale maps, many of them approximating the standard scale of 1:1,000,000, or about 16 miles to the inch, which give a general view of larger areas.

The topographical sheets are the fundamental maps; on these, directly or indirectly, all other maps are based. Except for parts of the Balkan Peninsula, all the countries of Europe have been covered by government surveys, carried out, as a general rule, by the respective war offices. In scale they vary from 1:25,000 (about 2,000 feet to the inch) to 1:200,000 (over 3 miles to the inch), with a tendency to average about 1:100,000, or 1½ miles to the inch. All of these maps existed before the war; and, for the student of the military operations of the conflict, it is simply a question of selecting those best suited to his purpose. Such a selection is attempted in the list below (see Nos. 7-10, 15, 20, 23, 24); comprehensive descriptions are available elsewhere.[1] As a rule the typical, rather than the largest-scale series have been enumerated, although the latter, such as the 1:20,000 map of Belgium, should be consulted in an intensive study of individual problems. Preference has also been given to colored maps; the 1:80,000 black-and-white map of France, although the standard, has been omitted because of its illegibility.

Some maps, although they are compilations and not directly based on surveys, may, on account of their relatively large scale, be classed with the topographical maps. To these belong the 1:250,000 map of the Balkans by the British War Office (No. 25) and the admirable map of Italy on the same scale by the Italian Touring Club (No. 21).

The general maps include both official maps and maps published by private firms. Some of the most valuable maps, geographically, of the regions concerned are to be found among the official maps of this class; although they are mostly on a larger scale than in the atlases in common use, they are synoptical and generalized in character (see Nos. 1, 2, 3, 26). Most of the war maps issued by private firms are adaptations of existing

[1] Vinzenz Haardt von Hartenthurn: Die militärisch wichtigsten Kartenwerke der europäischen Staaten. *Mitt. des k. und k. Militärgeogr. Inst.*, Vol. 27, 1907, pp. 96-239, Vienna, 1908.

W. Stavenhagen: Skizze der Entwickelung und des Standes des Kartenwesens des ausserdeutschen Europa. *Ergänzungsheft No. 148 zu Petermanns Mitt.*, 376 pp., Justus Perthes, Gotha, 1904.

G. M. Wheeler: Report upon the Third International Geographical Congress and Exhibition at Venice, Italy, 1881. Accompanied by Data Concerning the Principal Government Land and Marine Surveys of the World. 568 pp. Corps of Engineers, U. S. Army, War Department, Washington, 1885.

plates or combinations of maps contained in atlases previously brought out by the publishers. If taken from a good atlas, such maps often are excellent (see Nos. 16 and 17, the former not printed specifically as a war map). Few of the commercial war maps are original or contain information distinctively bearing on the war, other than overprints in red showing the location of fortresses, etc. One group that forms an important exception should be noted: the maps that indicate the position of the battle lines at different dates (Nos. 6, 12, 14, 19). Another group that is especially valuable consists of the physical maps, which show relief by means of altitude tints (Nos. 5, 13, 22).

Most of the maps that portray actual war conditions will probably not be made public until after the cessation of hostilities. To this category belong the detailed maps showing the location of trenches and other military works which are constantly being prepared at the front from photographic reconnaissances by airplane. A few maps of this type have, however, been published, some accompanying magazine articles; and the land operations of the Gallipoli campaign are cartographically laid down on a map published by the British War Office (No. 28).

In the following list, arranged according to battle fronts, a brief characterization is added in brackets after the title of each map.

### Europe as a Whole

(1) **Europe and Asia.** 1:1,000,000. Compiled at the Royal Geographical Society under the direction of the Geographical Section, General Staff. Drawn and printed by the Ordnance Survey, Southampton, 1914 to date. At least 39 sheets issued. [Each sheet 4° in lat. and 6° in long. (12°, north of 60° N.). Drainage in blue, relief in brown contours (interval 200 meters in Europe, 500 in Asia), roads in red, railroads in black.]

(2) **Europe.** 1:1,000,000. Service Géographique de l'Armée, Paris. At least 15 sheets issued. [Each sheet 4° in lat. and 6° in long. Drainage in blue, relief in brown shading, roads in red, railroads in black.]

(3) **Übersichtskarte von Europa.** 1:750,000. Militärgeographisches Institut, Vienna. 40 sheets. [Each sheet 3° in lat. and 4° in long. Drainage in blue, relief in brown shading (another edition with contours and altitude tints), roads in red, railroads in black, woods in green.]

(4) **Generalkarte von Mitteleuropa.** 1:200,000. Militärgeographisches Institut, Vienna. 282 sheets. [Covers Austria-Hungary and adjacent regions. Each sheet 1° in lat. and long. Drainage in blue, relief in brown hachuring, railroads and roads in black, woods in green.]

(5) **Bartholomew's Orographical Map of Central Europe.** 1:2,000,000. John Bartholomew and Co., Edinburgh. [Excellent map with altitude tints.]

(6) **Kriegsstands-Karte der Deutschen und Österreichisch-Ungarischen Armeen in 14tägigen Kurven.** 1:4,000,000. Dietrich Reimer, Berlin. [Shows together, on one map, the progressive positions of the eastern and western fronts at intervals of two weeks. The present edition covers the period from the beginning of the war to November 1, 1914.]

### Western Front

(7) **Carte topographique de la Belgique.** 1:100,000. Institut Cartographique Militaire, Brussels, 1903-12. 26 sheets. [Drainage in blue, relief in brown contours (interval, 10 meters), roads in red, railroads in black, woods in green.]

(8) **Carte de la France dressée par ordre du Ministre de l'Intérieur.** 1:100,000. Librairie Hachette et Cie., Paris. 587 sheets. [Drainage in blue, relief in gray shading, roads in red, railroads in black, woods in green.]

(9) **Carte de France.** 1:200,000. Service Géographique de l'Armée, Paris. 82 sheets. [Drainage in blue, relief in brown contours (interval, 20 and 40 meters), roads and railroads in black, woods in green.]

(10) **Carte de France dressée au Dépôt des Fortifications.** 1:500,000. Service Géographique de l'Armée, Paris. 15 sheets. [Drainage in blue, relief in brown contours (interval, 100 meters), roads and railroads in black, woods in green.]

(11) **Carte du Théâtre des Opérations (Front Occidental).** 1:500,000. Service Géographique de l'Armée, Paris. 15 sheets. [A special reprint, divided into quarter sheets, of the northeastern part of the map by the Dépôt des Fortifications, listed immediately above.]

(12) **Nord-Est de la France, Alsace, et Belgique.** 1:500,000. Imprimerie Berger-Levrault, Nancy. [Bears somewhat faint but detailed purple lines showing the front on April 1, 1916, and the maximum advance of the Germans in September, 1914.]

(13) **Bartholomew's [Physical] Map of North-Eastern France, Belgium, and the Rhine.** 1:1,000,000. John Bartholomew and Co., Edinburgh. [Excellent map with altitude tints.]

(14) **Stanford's Half-Inch Map: (a) of the British Front in France and Flanders, 1:126,720; (b) of the Battle Front between the Somme and Soissons, 1:126,720.** (Stanford's War Maps, Nos. 17 and 18.) Edward Stanford, London. [A bold but detailed red line shows the position of the battle front on June 27, 1916. Possibly other maps, not received by the Society, complete this series.]

### Eastern Front

(15) **Special Map of European Russia.** 1:420,000. Military Topographical Section of the General Staff, Petrograd. 177 sheets. [In Russian. Drainage in blue, relief in brown hachuring, roads and railroads in black, woods in green.]

(16) **Map of European Russia, begun by E. Petri and completed by J. M. Schokalsky.** 1:2,000,000. Pls. 15-30 of Marcks's Atlas. A. F. Marcks, Petrograd. [In Russian. The best general map of Russia available. Relief in brown hachuring. The atlas of which these sheets form a part is a Russian edition, engraved in Germany, of Debes' Handatlas, Leipzig. These sheets of Russia, however, are engraved in Petrograd.]

(17) **Deutsch-Russische Grenzlande.** 1:2,000,000. Velhagen und Klasing, Leipzig. [Possibly the best general locational map of the eastern war zone. Reprinted and combined from sheets in Andree's Handatlas.]

(18) **Carte du Théâtre des Opérations (Front Oriental).** 1:1,000,000. Service Géographique de l'Armée, Paris. 20 sheets. [A special reprint, differently subdivided, of the French map of Europe, 1:1,000,000, listed above under (2).]

(19) **The Russian Battle Front in Europe.** 1:217,600. (Stanford's War Maps No. 19.) Edward Stanford, London. [Shows, in red, the position of the battle fronts in April, 1915, and in September, 1915, or before and after the great German advance.]

AUSTRO-ITALIAN FRONT

(20) **Carta Topografica del Regno d'Italia.** 1:100,000. Istituto Geografico Militare, Florence. 277 sheets. [Various types; the most feasible the *edizione policroma con l'orografia a curve e sfumo*—with relief in contours (interval, 50 meters) and shading.]

(21) **Carta d'Italia del Touring Club Italiano.** 1:250,000. Prepared by the Istituto Geografico De Agostini, Novara, for the Touring Club Italiano, Milan. 58 sheets. [A superb map, representing the acme of the engraver's art. Relief in masterly hachuring in brown, supplemented by unobtrusive contours.]

(22) **Carta Ipsometrica: Le Tre Venezie (Venezia Tridentina, Venezia Propria, Venezia Giulia).** 1:250,000. Istituto Geografico De Agostini, Novara. [An edition, with altitude tints, of the corresponding part of the Italian Touring Club map listed immediately above.]

BALKAN FRONT

(23) **Topographical Map of Serbia.** 1:75,000. Geographical Section of the General Staff, Belgrade. 97 sheets. [In Serbian. Relief in brown contours (interval, 50 meters), roads in red, woods in green.]

(24) **Topographical Map of Rumania.** 1:50,000. Geographical Institute of the Army, Bukharest. 415 sheets. [In Rumanian. Drainage in blue, relief in contours (interval, 10 meters), woods in green.]

(25) **The Balkans.** 1:250,000. Geographical Section, General Staff, War Office, London. 11 sheets. [An eastward extension of a map known as "Turkey in Europe, Eastern and Central," published in 1910, which in 10 sheets covers the remainder of Turkey in Europe, as formerly constituted. Drainage in blue, relief in brown contours, woods in green.]

(26) **Balkans.** 1:1,000,000. Service Géographique de l'Armée, Paris. 6 sheets. [Identical in execution with the French map of Europe, 1:1,000,000, listed above (No. 2).]

(27) **Map of the Peninsula of Gallipoli and the Asiatic Shore of the Dardanelles.** 1:63,360. Geographical Section, General Staff, War Office, London, 1915. [A large-scale map. Relief in contours, interval 100 feet.]

(28) **Map of the Anzac Position, Gallipoli, to illustrate Sir Ian Hamilton's despatch of December 11th, 1915.** 1:20,000. Geographical Section, General Staff, War Office, London, 1916. [A detailed map showing the position of the British and Turkish trenches as known on August 6, 1915. Relief in brown contours, interval 10 feet.]

# GEOGRAPHICAL RECORD

## AMERICAN GEOGRAPHICAL SOCIETY

**Award of the Charles P. Daly Medal.** The Charles P. Daly Medal for Geographical Research has been awarded to Professor George G. Chisholm of the University of Edinburgh, Scotland. The inscription on the medal explains the selection of Professor Chisholm for one of the highest awards of this Society in 1917. It reads as follows:

TO
GEORGE GOUDIE CHISHOLM
SCHOLAR, TEACHER, AUTHOR
THROUGH SUSTAINED RESEARCH
AND BROAD GENERALIZATION
HE HAS CREATED A WORLD-WIDE
INTEREST IN THE GEOGRAPHICAL
BASIS OF COMMERCE

Professor Chisholm was one of the first to develop a body of scientific principles in the field of commercial geography and to organize a great mass of economic data. He has presented his material with rare breadth and clearness in a number of standard and widely known publications.

**Award of the David Livingstone Centenary Medal.** The David Livingstone Centenary Medal has been awarded twice since its foundation in 1913, first to Sir Douglas Mawson and second to Colonel Theodore Roosevelt. A third award has now been made, to Manuel Vicente Ballivian, president of the Geographical Society of La Paz, Bolivia. Señor Ballivian has done more for the promotion of geographical knowledge in Bolivia than any other man in the history of that country. This achievement he has accomplished no less by the encouragement of young men, and especially explorers, than by the broad scholarship displayed in his own researches and by his indefatigable efforts to secure government aid for geographical and statistical work.

## NORTH AMERICA

**Domesticated Reindeer in Alaska and the Canadian North.** Into the eastern and western extremities of North America the domesticated reindeer has been successfully introduced from the proximate ends of the Old World. To Alaska reindeer from the Tungus were first brought in 1892. How well they have thriven and how materially they are helping to raise the status of Innuit and Indian is clearly demonstrated in the reports of the U. S. Bureau of Education, under whose jurisdiction they fall. The current report, that for 1914-15 (*Bur. of Educ. Bull., 1916, No. 47*, Washington, 1917), indicates a continuance of the uninterrupted success that has attended the service since its inception twenty-five years ago. Although nearly 9,000 head of reindeer were slaughtered during the year, the net increase was 21 per cent, and the total herd now numbers over 70,000. Plans are under way for the commercialization of the industry. The trial shipment of meat to Seattle noted in the last report (see the *Geogr. Rev.*, Vol. 1, 1916, p. 228) has been repeated, and a proposal from a cold-storage company to market the meat on a commission basis has been laid before the native owners.

Dr. Grenfell's introduction of reindeer from Lapland into northern Newfoundland made several years later (1908) has likewise proved successful and has benefited greatly the fisherfolk of that inhospitable shore. But a later attempt on the part of the Canadian government met with disaster. In 1911 fifty head of reindeer were purchased from Dr. Grenfell for introduction into the Northwest Territories. The story of this unfortunate experiment is recounted by Emile Miller in a recent article (L'Introduction du renne en Amérique, *Bull. Soc. de Géogr. de Québec*, Vol. 11, 1917, No. 1).

The herd was shipped via Sydney, Cape Breton, to Athabaska Landing, whence it wintered at Fort Chipewyan. At the beginning of the succeeding summer, diminished by nineteen, it was taken to an enclosure in the vicinity of Fort Smith. But the plague of gad-flies so tormented the unhappy beasts that they promptly broke their bounds. Only a dozen were recaptured and one of these died shortly. During the winter the eleven survivors were stabled and fed upon lichens and hay. The diet proved fatal to

seven. The remaining four were then moved to an island in Great Bear Lake, where two more succumbed, and the experiment appears to have terminated.

But the impracticability of the acclimation of the reindeer in northern Canada as a whole is not proved thereby. The experiment failed through ignorance or disregard of the character of the natural habitat of the beast. The reindeer can hardly be expected to thrive in a region where the summers are warm enough for wheat cultivation. It is true that in the winter the caribou migrates far south, as the name Reindeer Lake testifies, but in summer return is made to the north. The southern summer limit of the caribou runs approximately from Chesterfield Inlet on Hudson Bay to the northern shore of Great Bear Lake; in the western part it is roughly coincident with the northern limit of trees. The neighborhood of the former point should prove a veritable reindeer paradise. But against introduction here it is urged that only the Yellow-Knives and Dog-Ribs would be benefited. Apart from the ethical argument still favorable to the project, the outposts of civilization would at least gain indirectly. The settlers in the Mackenzie Basin should then find the Indians of the Barren Grounds more desirable neighbors, and by gradual extension of the reindeer westward a practicable route from Great Slave Lake to Hudson Bay could be established.

**The Basis for the Official Designation of Lassen Peak.** In the February *Review* (p. 148) under the well-chosen heading "The Local Name of Lassen Peak" is given an account of local usage that deserves more than ordinary attention. Local usage is sometimes ephemeral, but in cases involving literature names should not be changed without good reason. The recent volcanic activity of Lassen Peak has given it not only national but international prominence as one in the belt of active volcanoes girding the Pacific. There should be no confusion concerning its name. It may therefore not be amiss to outline somewhat fully the evidence that impelled the U. S. Geographic Board to render its decision in favor of the form "Lassen Peak," as enlarged upon in the *U. S. Geological Survey Bulletin No. 294* (see the December, 1916, *Review*, p. 464).

The rush of gold seekers overland to California in 1848 to 1853 and the Government survey for a railroad route to the Pacific about the same time drew marked attention to all guiding peaks and mountain passes by the way. One of the routes surveyed by Capt. E. G. Beckwith in 1854 traversed Noble's Pass from Susan River to the Sacramento Valley, touching the northern base of Lassen Peak, and in his hachure map of this portion of his route (*Pacific Railroad Survey Repts.*, Vol. 11) Beckwith gives a clear view of Mount St. Joseph, with its radial drainage of Hat Creek, Battle Creek, and the head of Feather River well defined and named. In the text (*ibid.*, Vol. 2) Beckwith mentions Mount St. Joseph a number of times and adds, parenthetically, "sometimes called Lassen's Peak." Note the possessive form and the correct spelling. Beckwith followed the old immigrant road then in use and touched the base of "Black Butte," now well known as the Cinder Cone, of which he gives a brief account. On Beckwith's map Lost Creek is called Wolf Creek, which joins Hat Creek to form what was then called Canoe Creek, the scene of the almost disastrous floods following the great eruptions of Lassen Peak on the night of May 19 and the afternoon of May 22, 1915.

Peter Lassen, the Danish trapper, at the time the railroad route surveys were made, was the most active guide and noted pioneer of the region, and Lassen Peak was well named in his honor. To this all agree, and it is equally apparent that the form Lassen's Peak was the first and only local usage of early mining days. To trace local usage from then till now we must be guided largely by definite records in maps and reports concerning the region.

Among the maps of northern California in the Library of Congress and other large libraries in Washington, D. C., there are at least thirty giving sufficient detail to locate and name the mountain under consideration. On these maps five names are used for the mountain. One map calls it Mount St. Joseph, as already noted; another calls it Lassen Mountain; five call it Mount Lassen; eight Lassen Butte, and fifteen Lassen Peak.

As to Lassen Butte or Lassen Peak, Whitney's statement given below should be decisive in favor of Lassen Peak.

J. D. Whitney, W. H. Brewer, and Clarence King of the California Geological Survey visited the mountain in 1863 and were the first to study and describe its remarkable features. Incidentally in a footnote (California Geological Survey: Geology, Vol. I, 1865, p. 310) Whitney refers to the name of the mountain and remarks: "This is the volcanic mass designated as Mount St. Joseph on the Pacific Railroad maps; but it is universally known in California as Lassen's Butte or Peak; we prefer the English word, especially as the French one is not properly used when applied to a high mountain. A butte, according to the dictionary of the French Academy, is a '*petite élévation de terre*' or a '*petit tertre*'; 'knoll' would be the exact translation."

The local usage of the name Lassen Butte or Lassen Peak that prevailed in Whitney's day appears to have prevailed in a greater or less degree up to the present time. No other names for the mountain appear upon the maps examined that were published before 1884, and this includes not only those of private compilation but also the Government publications, the especially valuable map of the California Geological Survey in 1874, the General Land Office map in 1876, and the Wheeler Survey map in 1879, which is the result of a large amount of field work upon and about Lassen Peak that familiarized the topographer in charge not only with topographic details but also with the local usage of names.

George Sandow made the subdivision survey of Township 30 North, Range 4 East, at intervals from 1871 to 1883, and his township plat was accepted by the General Land Office on March 28, 1884. Lassen Peak stands just outside of the township line on the north side but was included by Sandow in his plat under the name Mount Lassen. This is, as far as I am aware, the first appearance of the name Mount Lassen in public records. The plat shows the rim of an old crater extending as a prominent ridge about three miles to the southwest from Mount Lassen, to what Sandow has called "South Butte of Mt. Lassen." This latter prominence is now known, especially to the Forest Service, as Brokeoff Mountain and is in plain view from the Sacramento Valley.

Apparently as a direct result of Sandow's use of the name Mount Lassen, Keddie of Plumas County, who had previously called the mountain Lassen Butte (1886), changed it to Mount Lassen (1892) on the official map of Plumas County. It should be remembered, however, that the mountain is not in Plumas County, but in Shasta County, to be noted later.

The General Land Office maps of 1885 and 1891 used the name Mount Lassen, but in 1900 and 1913 they apparently returned to Lassen Peak for the mountain within the Lassen Peak National Monument. On the map for 1913, however, a new element of confusion was introduced in applying the name Mount Lassen to what has been already noted as Brokeoff Mountain.

Lassen Peak is in Shasta County, and, on the three maps of that county examined, two contained the name Lassen Butte and the third Lassen Peak. There is but one more state map to which attention need be called, namely, the "Geomorphic Map of California and Nevada," 1908. It was prepared with great care by the Earthquake Investigation Commission, and the names it contains, among which is Lassen Peak, are based on well-considered authority.

The matter of local usage is undoubtedly of great importance in considering the adoption of names. For this reason I may be permitted to refer very briefly to my own experience on many trips into that region during the last thirty-three years. My first ascent of the peak was in July, 1883, and the greater portion of the summers from 1885 to 1893 was spent in that region surveying for the Lassen Peak geological folio. To study the recent volcanic activity of the mountain I made numerous ascents of the peak in the summers of 1914, 1915, and 1916. During the whole of this long experience (1883 to 1916), with abundant opportunities to learn the opinions of the people, local usage as to the name of the peak was carefully noted. A considerable number have called it Lassen Butte, and the name is still used locally in Shasta County, but much the more common local usage throughout the region during 1882-84, when the topographic and geologic surveys were made for the folio, was Lassen Peak. The name Mount Lassen was rarely used in that region as early as 1885.

The publication of the Lassen Peak folio and other reports, including Whitney's of the California Geological Survey on the geology of the region, gave to the name Lassen Peak a definition that fixed it to the mountain more securely than any other name. Its use in designating the Lassen Peak National Monument and the first National Forest of the region gives it a legal status, and when the U. S. Geographic Board was asked for the correct name of the mountain, with the evidence already cited as to the use of the name, it readily decided in favor of Lassen Peak.

There can be no doubt, however, that within the last few years since the recent volcanic activity appeared the local use of the name Mount Lassen has greatly increased, but the name Lassen Peak is still in local use, and prevailingly in general use. Professor R. S. Holway of the University of California and other writers who use names with care, so as to avoid confusion when writings are compared, use Lassen Peak.

The widespread use of the name Mount Lassen is to be found in the newspapers. The volcanic activity of the mountain is reported to the Associated Press and spread all over the country by the *Searchlight* of Redding, an excellent daily that is keenly alive to the best interests of the country. A few months ago a lecturer in Redding concerning the volcanic eruption called the mountain Lassen Peak. He was reminded of local usage, and to correct what is considered a wrong tendency in the press the U. S. Geological Survey issued *Press Bulletin No. 294*. It is gratifying to note that

the *Searchlight*, with commendable zeal, now sends out the Associated Press dispatches sometimes, if not always, with the name Lassen Peak, and if other papers would do likewise local usage would soon correct itself and by adopting the name Lassen Peak prevent avoidable confusion among scientific writers.

In closing I wish to emphasize the fact that the name Mount Lassen lacks priority and the authority of general publication. Furthermore, its use has been rendered confusing by being applied, as already pointed out, not only to Lassen Peak but also to Brokeoff Mountain. It is earnestly hoped that the press may exercise its righteous function of safeguarding science by changing local usage from Mount Lassen to Lassen Peak. J. S. DILLER.

**Saskatchewan's "Bumper" Wheat Crop of 1915.** To the world's record wheat crop of 1915 Canada's prairie provinces contributed a full quota (C. C. James: An Historical War Crop—The Canadian Wheat Crop of 1915, *Trans. Royal Soc. Canada*, Ser. 3, Vol. 10, 1916; for wheat area see map on p. 28 in this number). Saskatchewan, premier of the three provinces in wheat production, alone raised 173,723,775 tons. This record, in part accounted for by increased acreage, is due still more to increased yield following unusually favorable climatic conditions. The favoring circumstances for the 1915 crop began in the previous year. The lightness of the 1914 crop reduced soil depletion and permitted more summer fallowing and fall ploughing, while the latter operation was also encouraged by a protracted period of fine weather. The year 1915 opened auspiciously. The mildest February on record for twenty years was followed by an early spring. Seeding was carried out in fine April weather. In response to the war call for expansion of food resources the area planted was extended to approximately 6,885,000 acres, representing the culmination of a steady progress from the million or so acres under wheat when Saskatchewan was created a province in 1905. Plentiful rains fell in June and early July. For the greater part of the province harvesting and threshing were carried out under "ideal weather conditions," though the heaviness of the crop protracted operations into November in the southwestern region. Yield and quality alike proved high. Against an average yield of 19.5 bushels per acre and a minimum of 12.4 in 1914 the crop of 1915 yielded 25.2, a figure only slightly exceeded in the province by the record of 1901 (*Ninth Ann. Rept. Secretary of Statistics, Dept. of Agric., Prov. of Saskatchewan*, Regina, 1916).

**The Glaciers of the Torngat Mountains, Labrador.** The highest and also the least-known mountains in eastern Canada are the Torngats (or Torngaks) in the Ungava Peninsula of northeastern Labrador. They have been supposed to reach an altitude of 10,000 feet and to have the distinction of being the highest mountains in North America east of the Rockies. They would have a double distinction if they should be found also to support living glaciers, for the glaciers of other mountains farther south vanished in the remote past. But their height above sea level is probably not more than 6,000 feet, according to the recent studies of Dr. A. P. Coleman, who visited them in 1915 and climbed Mt. Tetragona ("Mt. Tetragona: A First Ascent in Labrador," and "The Building of the Torngats," *Canadian Alpine Journ.*, Vol. 7, 1916, pp. 5-11 and 67-70). Dr. Coleman did find many small living glaciers, but, if correct, his estimate of the height of the highest summit—about 6,000 feet—leaves Mount Washington in New Hampshire (6,290 feet) the highest peak east of the Rockies.

The Torngats are wholly without timber. They break down so abruptly to sea level on the east (probably a fault-line scarp), and their relief is so rugged, that they have an extraordinarily bold and impressive seaward aspect, in spite of the presence of considerable remnants of a former domed surface that has survived erosion on the landward side. This domed surface was a preglacial plateau—once part of the extensive and well-known Laurentian peneplane—now greatly dissected by local glaciers which have diminished in length until at the present time they occupy, with their tributary snowfields, very limited areas at the bases of the cirque walls. The glaciers are still at work in the higher cirques and valleys, but none seems to be very active. Formerly they were large and powerful and cut great valleys with sharp-crested ridges and bold isolated mountains between. In some places the main lines of ice drainage afforded outlets to the sea for the great Labrador ice sheet of the past, just as the marginal tongues of the inland ice of Greenland flow to the sea in troughs cut across the rugged coastal belt.

## SOUTH AMERICA

**A Campaign Against Malaria in Peru.** The Peruvian Government is instituting a campaign against malaria, a disease that, under the unsanitary conditions generally existent in Peru, forms a serious obstacle to progress in some of the most promising sections of the country (*South American Journ.*, April 7, 1917, p. 301). Certain parts

of the coast valleys are prone to malaria in the latter part of the summer season, when subsiding floods and maximum temperatures supply optimum conditions for the disease carriers. In the past Lima and all the lower Rimac valley have been notorious for their intermittent fevers. This insalubrious spot was one of the localities to which criminals were despatched in Inca days. Though conditions in the city have improved of late the outskirts still possess a bad reputation (Ignacio La Puente: Paludismo en la costa del Perú, *Bol. Soc. Geogr. de Lima*, Vol. 31, 1915). Still more serious is the disease in the deep-cut valleys that penetrate the heart of the plateau. There malarial conditions flourish the year round, merely augmenting somewhat at the beginning and end of the rainy season. The phenomena in the Marañon valley have been described by Raimondi ("El Departamento de Ancachs," Lima, 1873).

In prosecution of the campaign the Peruvian Government proposes to import, duty free, the necessary quantity of quinine. The statement is an interesting reminder both of the lack of industrial development in Peru and of the still unutilized resources that wait more favorable conditions for exploitation. The *montaña*, the lower slopes of the Eastern Andes from Ecuador to Bolivia, is the native home of the cinchona species. Once Peru and Bolivia exported large quantities of the "Peruvian bark," though the drug was never fabricated. Of recent years even export of the crude article has practically ceased: it cannot compete with the better circumstanced product of the East.

**The Age of the Bolivian Andes.** In a paper of only three pages (E. W. Berry: The Age of the Bolivian Andes, *Proc. Natl. Acad. of Sci.*, Vol. 3, pp. 283-285, April, 1917) there are announced some remarkable fossil evidences which confirm recent physiographic conclusions as to the late Tertiary and early Pleistocene uplift of the Central Andes. Fossil plants at Corocoro (13,000 feet) and Potosí (14,000 feet), which include a fern and tropical trees allied to those now living on the Amazon lowlands, denote a more humid climate and a far lower elevation, and, the author says, "the sea deposited a part of these strata [on the Bolivian highland] in late Tertiary or Pleistocene time, and since that time there have been differential vertical movements amounting to a minimum of 13,500 feet." The author concludes: "There is, then, definite evidence that parts of the high plateau and of the eastern Cordillera stood at sea level in the late Tertiary."

In various papers in past years Bowman has demonstrated the rapid and recent uplift of the Central Andes and more recently in "The Andes of Southern Peru" (1916) has elaborated a physiographic argument, based on detailed topographic surveys in southern Peru, which concludes that an uplift of at least 7,000 feet is demonstrable and that it may have been much more. The convergence of the physiographic and the fossil evidence is singularly conclusive, and the full report on the fossil evidence may be expected to form one of the major contributions to the physiographic history of the Andes within the decade.

**Changes in the Character of the Precipitation in British Guiana.** A recent critical examination of past meteorological records relating to Georgetown, Demarara, has led to some interesting results, especially with regard to rainfall. The observations under consideration included an earlier series for the period 1846-56, taken in the Observatory, and a later series for 1882-1915, taken at the Botanic Gardens. The later series was divided into three sub-groups, and the average annual rainfall characteristics of the four periods thus obtained were worked out in detail. While the average annual rainfall for the four periods shows the fluctuation to be anticipated, the character of individual rainfalls is marked by a steady progressive change in the direction of greater frequency and diminished intensity. This appears in the following table.

| Period | Days of Rain | | | | Rainfall in inches |
|---|---|---|---|---|---|
| | <½ in. | ½-2 ins. | > 2 ins. | Total | |
| 1846-1856..... | 114 | 54 | 9 | 177 | 95.86 |
| 1882-1896..... | 126 | 53 | 8 | 187 | 93.57 |
| 1897-1906..... | 150 | 50 | 6 | 206 | 89.86 |
| 1907-1915..... | 164 | 48 | 6 | 218 | 99.92 |

These figures are given in the 1915 report on British Guiana by the British Colonial Office (*Ann. Colonial Repts. No. 910*, London, 1916). The examination of the meteorological records referred to above was incident on a change in the form of the annual publications. Whereas the detailed report formerly appeared in the Blue Book for the colony, it will now be incorporated in the Annual Report of the Meteorological Division of the Department of Science and Agriculture and the record in the Blue Book will be confined to a fairly full summary.

**A New Publication of the Argentine Meteorological Office.** With the month of January, 1916, the Argentine Meteorological Office began the issue of a monthly bulletin. This is a quarto publication, and the first number contains 40 pages, with six maps and one diagram. The plan of the *Boletín Mensual* is to supplement the regular data given on the daily weather map by means of more complete and more accurate information than is obtainable by telegraph. The tables are unusually complete and give the monthly summaries for 75 stations, thrice-daily observations for 23 selected stations, and rainfall data for 1,421 stations. A series of excellent charts show the total rainfall for the month, the excess and deficiency of the monthly rainfall in relation to the normal, the total rainfall from July 1 to January 31, the excess and deficiency of the rainfall from July 1 to January 31 in relation to the normal for that period, the mean temperature, pressure, and the prevailing winds for the month, and the absolute maximum and minimum temperatures for the month. The new *Boletín Mensual* maintains the high standard of all the publications of the Argentine Meteorological Service. The February, 1916, number of the *Boletín* contains, in addition to the matter above noted, a summary of the weather of the month by Mr. H. H. Clayton, the Chief of the Forecasting Division.

R. DEC. WARD.

## EUROPE

**Soundings as an Aid to Navigation in Approaching the French Coast.** A recent communication dealing with methods of recognizing an unlighted coast from a ship nearing land in foggy weather is of particular interest in these war days (J. Renaud: Les atterrages, en temps de brume, des grands ports français sur l'océan Atlantique, *Comptes Rendus de l'Acad. des Sci. de Paris*, June 11, 1917). In favorable weather the outline of the coast enables the mariner to determine the location of the port for which he is bound. Whenever the visibility is low, however, an easy way of ascertaining the ship's position, once land is sighted, is to take soundings and bottom samples and thus to identify one's position on the chart. The example is given of a vessel bound for Havre from a port in North America and traveling continuously under a clouded sky which prevents the officers from taking astromonical observations. At the entrance to the Channel soundings will enable the captain to determine his position. The depth decreases here in a fairly uniform manner. Nearing the French coast the vessel would keep its course in waters exceeding 16 fathoms (30 meters) in depth, thus rounding the Pointe de Barfleur and entering the estuary of the Seine, where the depths begin to decrease. By hugging the southern shore of the estuary it is possible to reach the Havre anchorage with the sole aid of bathymetric data.

Near Brest the bottom is rough and dangerous. While the making of this port shortens transatlantic trips by five to seven hours, the time saved can hardly be reckoned as a compensation for the numerous shoals and rocks which beset the approaches. In war times, of course, these obstacles are favorable to the defence. Farther south, between Penmarch and the mouth of the Gironde, there is very little difficulty in estimating the ship's position by means of soundings. The bottom of the sea here slopes uniformly towards the region where oceanic depths begin. A wide deposit of ooze helps furthermore in detecting this locality. By exercising ordinary caution a ship can proceed landward from a depth of 164 fathoms (300 meters) until the 27-fathom (50 meter) line is reached. Beyond that, soundings alone do not suffice, as is the case at the mouth of the Seine. Only La Pallice, the harbor of La Rochelle, can be made by soundings, by proceeding along the south wall of the Antioche deep.

In war times, when lights are frequently extinguished along the coast, these undersea determinations are of the utmost importance and testify to the great value of detailed oceanographic investigation.

**The Distribution of Italy's Power Resources.** Italy's position in the war is greatly affected by her scarcity of fuel. The Italians, taken as a whole, are farmers rather than manufacturers. At the same time the high development which technical science has attained in Italy tends to force the country into the ranks of industrial producers. In taking stock of their power resources, Italians found that their northern provinces contained lignite beds which were susceptible of development. From 600,000 tons produced in 1913 the output was increased to 1,200,000 in 1916. According to information from F. T. F. Dumont, American Consul at Florence (*Commerce Rcpts.*, May 24, 1917), this quantity is estimated to be the maximum which can be obtained from the Italian beds. Other sources of energy will have to be utilized; and attention is being turned to forestry and water power.

Italy's forests cover a scant 13 per cent of the peninsular area. Deforestation has been excessive, particularly in the south. The power to be developed from this source

is negligible. As an offset to this disadvantage the streams of northern Italy, especially in the Provinces of Piedmont, Lombardy, Venice, Tuscany, and the Abruzzi, contain potential energy which has been estimated at 5,000,000 horse-power. Less than one-fifth of this amount is now available. The development of this energy would free Italy from dependence on foreign coal.

The situation as regards power in Italy is therefore related to developments in the northern districts. In the hydro-electric field the mechanical energy to be obtained is transmissible as far south as required.

**Hydro-electric Power in Russia.** An official estimate places the potential value of Russian water power at not less than 12,000,000 horse-power, of which today only 10,000 horse-power is being utilized. The calculated resources lie chiefly in the mountainous regions of Asiatic Russia, far from centers of industry, but there also exists a considerable resource in the glaciated lake area adjoining Finland on the east that could be put to immediate use. The lately completed railroad line from Petrograd to Kola and Catharine Harbor (see "Russia's Wartime Outlets to the Sea" in the *Geogr. Rev.*, Vol. 1, 1917, pp. 128-132; also *Commerce Rcpts.*, 1917, No. 28) might be electrified, at least in the section across the Kola Peninsula. While the line is today of predominantly military importance it has prospects for an economic future. Some day the thousands of square miles of virgin forest covering the region traversed by the railroad will be exploited and its water powers will undoubtedly be in demand (Charles Rabot: La Houille Blanche en Russie, *La Nature*, March 31, 1917).

## AFRICA

**Economic Exploration in French West Africa.** M. René Chudeau, who in 1913-14 carried out an extensive exploration on the eastern margin of the Djouf, one of the sand areas of the Sahara, is reported to have returned from another Saharan journey (*Bull. Soc. de Géogr. de Paris*, Vol. 38, 1916, No. 7-9, pp. 454-455; on the 1913-14 journey, see "L'Azaouad et le Djouf," *La Géogr.*, Vol. 30, 1914-15, pp. 417-436, with map, 1:200,000, and other articles cited therein). This last journey, accomplished under the auspices of the Colonial Office and the Geographical Society of Paris, was designed to investigate the economic possibilities of that portion of Upper Senegal traversed by the railroad from Kayes to the Niger. M. Chudeau brings back an entirely favorable report. Irrigation has made considerable advancement. Lake Faguibine, west of Timbuktu, nearly desiccated during recent years, has been almost completely refilled, thanks to skillful engineering works supplemented by the winter flood of 1915. The future of the cattle industry is also bright. Already some 100,000 head of cattle are brought to market from the neighborhood of the forestal zone. A cold storage and packing plant has already been established, and the erection of others is projected.

**The Diary of a Trader in South Africa.** Through the generosity of Mrs. Mary L. McKiernan the Society has come into possession of the manuscript diaries and notes of her husband, Gerald McKiernan, who made a number of extremely interesting trading journeys in South Africa from 1874 to 1879. The record covers three main journeys: a hunting and trading trip in Damara Land and Ovambo Land (1875-76); an expedition to Lake Ngami (1877-78); and a trip to the Okavango River (1878-79).

The journey from Walfish Bay northeastward across the Kalahari Desert to Lake Ngami is of chief interest. The wagon route led from water hole to water hole along the beds of streams, across the great "thirst," as the Kalahari is often called, and so to the marshes and mud flats of the lake. Trade was by barter, the bullock carts taking in general merchandise and bringing out ivory. There are vivid descriptions of the native life about Lake Ngami and its tributary streams, the trade in maize, and the strange isolated life of the hunters and traders of every sort who at great hazard made long trips to remote and unexplored districts, where a highly profitable trade was often possible. There are also admirable descriptions of the incredibly immense herds of wild animals that grazed on the undisturbed grasslands north of the Okavango River in the region that corresponds in character and position with the Sudan on the northern edge of the tropical forest of Central Africa. From South Africa bands of Boers trekked northward, trading at native commercial centers, stopping now and then to grow a crop of grain or vegetables or waiting in bands of one or two hundred in some good hunting spot until the rains came and the next "thirst" became possible to cross. The traders were in occasional contact with them all the way from Ngami northward to Portuguese West Africa.

Among published accounts by other traders and travelers is one by C. J. Andersson which covers nearly the same region ("Lake Ngami, or Explorations and Discoveries

during Four Years' Wanderings in the Wilds of Southwestern Africa," New York, 1856). He and Galton tried to reach Ngami from Walfish Bay in 1851 and failed, but in 1853 Andersson went again by the same route and succeeded. It will be remembered that Livingstone discovered the lake in 1849, rumors of it, heard years before, exciting great interest among geographers. The long-delayed discovery of the lake is all the more remarkable in view of the fact that the Orange River had been discovered as early as 1760 and that in 1761-62 a well-equipped exploring expedition penetrated the interior of the Nama country farther north. Still farther north went an expedition in 1791-92 and brought back information about the Damara country. The diary of the first of these two expeditions is now in the British Museum (The Geography of South-West Africa, by H. Schlichter, *Scottish Geogr. Mag.*, Vol. 7, 1891, pp. 471-472 and 513-524, with bibliogr.). For a map of Lake Ngami and an authoritative summary of the work of Livingstone and others in the region see "Livingstone and the Exploration of Central Africa," by Sir H. H. Johnston (London, 1912, p. 101). Its discovery led to numerous efforts to reach it from other directions and to deal with the natives who lived about it and whose stocks of ivory attracted many traders. The lake is an important focus of native life, as shown especially well on a map by Passarge (Die Buschmänner der Kalahari, Berlin, 1907, p. 19).

McKiernan's account, begun but one year after Livingstone was laid to rest in Westminster Abbey, is of distinct value and should be published for wider distribution. It is a source of reliable data and mirrors with great faithfulness the wild life and the people of a frontier region still awaiting its full development. Unfortunately McKiernan was never able to complete his notes, though they cover the most interesting parts of his experiences. The sickness and privations undergone in Africa so affected his health that he was an invalid for many years and died at Altoona, Pa., on June 3, 1892.

## POLAR REGIONS

**The Latest News of the Crocker Land Expedition.** Through a message brought from Greenland to Copenhagen by Surgeon H. J. Hunt and cabled thence to America by the United States Minister to Denmark, direct word has been obtained from MacMillan, leader of the Crocker Land Expedition. He gives an interesting report of his latest journey over glacier-capped islands and across sea ice west of Etah, his base camp, to his farthest point, 103° W. on Finlay Island. The journey covered 1,350 miles and occupied 56 days. The accompanying map gives the route as nearly as can be shown from the brief cabled report.

It is most encouraging, after the many misfortunes that have befallen the expedition, to have so promising a report of actual results accomplished. The determination of the geographical positions of new islands, and of hitherto uncharted portions of coasts, known only through distant sights by much earlier explorers, is a real contribution. And if the published accounts are correct in assigning a latitude of 78° 18′ to the large island just east of Amund Ringnes Island, some of our best maps of this region will have to be remade. Among the more important results achieved in the journey across Ellesmere Island are observations on the extent of the glacier ice, the abundance of game, and the existence of "much coal." The party traveled from Ellesmere Island to Cape Southwest at the southern end of Axel Heiberg Island and thence westward to Amund Ringnes Island and finally to Finlay Island, where game became scarce and the lack of dog food compelled a return. Finlay Island and adjacent land masses are reported to show evidences of recent uplift on all shores—a valuable observation when ultimately shown on the maps of the expedition, since it will give us an important basis of comparison with the raised beaches and terraces of northwestern North America and particularly Labrador. The extent of the rise of the land since the removal of the great ice load of glacial times is one of the significant current problems of glaciology.

A third relief ship has sailed, and the news from MacMillan confirms the wisdom of that plan, for MacMillan says that there is food enough to last only until August, after which, should no relief come, the party would have to adopt the Eskimo style of living. Captain Robert A. Bartlett is in command of the third relief ship, the *Neptune*, a steam sealer especially chartered for the purpose, which left New York late in June with more than a year's provisions. Under his competent direction the safe and early return of the expedition is assured.

Dr. Hunt arrived in New York on June 20 and gave details of his own trip. In company with Ekblaw he went from Etah as far as South Upernivik, where Ekblaw remained. From South Upernivik Dr. Hunt traveled only with Eskimos and from Egedesminde to Holstensborg the journey was made by kayak. At the latter place he took a steamer to the Faroe Islands and Copenhagen, returning to this country via Christiania.

Dr. Hunt's journey over the thin ice of Melville Bay was unusually perilous, and the whole sledge trip of 1,400 miles, lasting from December 18, 1916, until April 16, 1917, was no less than an heroic achievement. Polar bear and narwhal meat was obtained

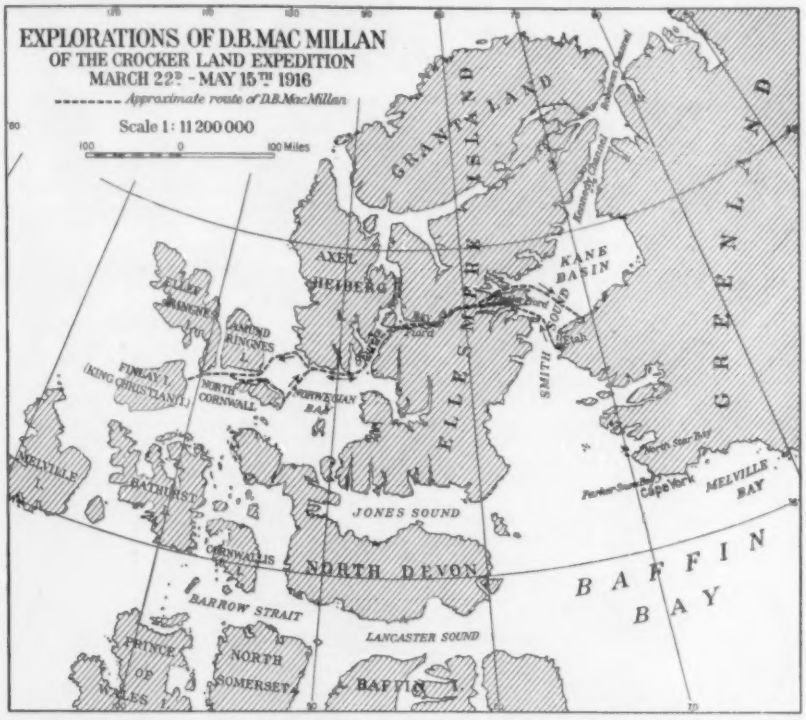


FIG. 1—Sketch-map showing the route of D. B. MacMillan of the Crocker Land Expedition, March 22 to May 15, 1916. Scale, 1:11,200,000.

from Eskimo caches. At night the party camped under the lee of icebergs. Five of the dogs died of starvation.

It is clear from Dr. Hunt's report that the whole account of the hardships, explorations, and scientific results of the expedition will be full of interest and an adequate recompense for the trials and disappointments of the party in carrying out plans in the face of great difficulty.

## HUMAN GEOGRAPHY

**Early Cultural Migrations and Their Criteria.** Under the title of "Ships as Evidence of the Migrations of Early Culture" (reprint from *Journ. Manchester Egyptian and Oriental Soc.*, 1915-16, 42 pp.) Dr. G. Elliot Smith again attacks the problem of the spread of early cultures. Among his numerous publications on this subject two recent papers may be mentioned: "The Origin of the Pre-Columbian Civilization of America" (*Science*, Vol. 44, 1916, pp. 190-195, with map) and "On the Significance of the Geographical Distribution of the Practice of Mummification: A Study of the Migrations of Peoples and the Spread of Certain Customs and Beliefs" (*Memoirs and Proc. Manchester Lit. and Philos. Soc.*, Vol. 59, Part II, 1915, No. 10, 143 pp., with maps).

Dr. Smith is a brilliant and facile writer who scores a point every time he crosses swords with an opponent; and he never writes a dull line. But his essays are strongly reminiscent of the slam-bang type of scientific discussion in vogue in America a half

century and more ago when scientific writings were largely polemic in nature: "puerile and unsatisfying" as the fetish of an African negro are the arguments of an opponent, or "childish subterfuges"! But the arguments of Dr. Smith are forensic and legalistic; his conclusions are not judicial. When an opponent (in a *scientific* debate) uses the phrase "burden of proof" it suffices not to reply, through the medium of strictly *a priori* argument, that the burden of proof rests on him. The burden rests equally upon both, who should abandon argumentation for facts and forsake counter-attack for well-reasoned deduction. It is the truth and not the frenzy of battle which the scientist cares to see.

If one start with the theory that "man has ever groped in the dark" and that similarity of invention, of ritual, and of "bizarre practices and beliefs" among widely separated peoples is conclusive proof of a common origin in some strangely endowed central group, then there is no difficulty whatever in "proving" that Egypt was the point of origin for the reed *balsa* on Lake Titicaca, the megalithic ruins of Easter Island, and the practice of mummifying the dead in India. Granted that the opposing theory of "the similarity of the working of the human mind" is "a soporific drug against the need for mental exertion" it does not establish Dr. Smith's theory to have his opponent's theory destroyed. The reader inevitably shares the author's amazement over some of the stupid replies which critics have made to his contentions; but the beam in Dr. Smith's eye is only too apparent to the bystander, as when he says (to take one of many similar illustrations) there is "no room for doubt that the Burmese type of ship was actually modeled on the plans developed in Egypt in the Pyramid Age."

No one who has lived among the Polynesians and the Amerinds will deny cases of striking ethnological resemblances between Polynesians and Malayans on the one hand and between the Indians of Mexico and Peru and the people of Eastern Asia on the other. But anthropogeographical science is not promoted by the mere assertion of such resemblances. Every traveler makes the observation. But what are the convergent facts? Is it not cogent to say that the time required by the people of the New World to domesticate maize, the potato, and the llama and develop a wonderful originality of design in weaving was long enough to enable them to learn terraced irrigation and that dried reeds tied in bundles will float a man? Is a granite cliff less suggestive to the primitive mind in developing a wall of trimmed rock for defence or shelter than a faint ancestral memory of great hewn stones on a remote Pacific island?

The world would indeed be too small to hold the books required to advance science if the human mind depended exclusively upon those circuitous methods of thought which we have outlined. There is so much of erudition and vital truth in this paper that we who have far less imagination and argumentative power wish Dr. Smith had more.

## GEOGRAPHICAL NEWS

**The Growth of General Geographical Interest and the War.** Serious interest in geography has been greatly increased by the war, as readers discover the geographical basis of military campaigns, the meteorological aspects of airplane work and scouting in general, and the necessity for persistent map study to understand the sequence of battles and campaigns over extended fronts in widely separated localities. Never before has there been so great a demand for really authoritative and scientific articles on war problems of current importance. This interest is undoubtedly permanent and will develop still more after the war, when new commercial relations become established and foreign lands again attract the traveler and the commercial explorer.

The development of general interest as manifested through the activities of this Society is marked by rapid growth in numbers (the membership has trebled in less than a year), through a vastly increased correspondence, and through a steadily rising standard of literary style and scientific content on the part of contributors to the *Geographical Review*.

**"Travel,"** published by the Travel Club of America, is now one of the best of the illustrated popular magazines. Its octavo size permits excellent reproductions of large-scale photographs, and its enterprising editors are securing some of the best available material on the scenic aspects of travel. The June number is typical; three articles are especially noteworthy:

Mukuntuweap: A Desert Yosemite, by Guy Elliott Mitchell
Along the Columbia River Highway, by Mark Woodruff
Denver's Romantic Mountain Parks, by Edgar C. MacMechen

The Travel Club of America aims to make the world more widely known through the media of photographs and popular descriptive accounts. Its success indicates not only an energetic management but also a sound guiding principle in the popular education of the time.

## Personal

Associate Professor N. A. Bengtson of the University of Nebraska will devote three months this summer to geological reconnaissance work in the foothill region of the Rocky Mountains in Montana, Wyoming, and Colorado and in the adjacent portion of the High Plains.

Professor Eliot Blackwelder of the University of Illinois is at present in California as a geological member of an advisory commission appointed by the Governor of California to investigate the petroleum resources of the state, their production and utilization. Beginning late in July Professor Blackwelder expects to spend six or eight weeks in the Laramie Range in southeastern Wyoming with a class of graduate students.

Professor J. E. Church, Jr., of the Department of Meteorology of the University of Nevada, has just completed two publications, one on "Snow Surveying: Its Problems and Their Present Phases" and the other on "The Evaporation of Snow." A third publication, on "The Relation of Mountains and Forests to the Conservation of Snow," will be issued in the winter. Professor Church has also begun, in co-operation with the U. S. Reclamation Service, an investigation of the relation of weather to run-off.

Professor F. E. Clements of the University of Minnesota is in the West and will devote the summer largely to grazing problems in connection with the national emergency. Incidentally he hopes to complete the task of securing material for a monograph he is planning to write on the bad lands.

Dr. O. E. Jennings of the Carnegie Museum of Pittsburgh will spend the summer in botanical exploration and collecting along the eastern shore of Lake Nipigon, the large lake in Ontario immediately north of Lake Superior, and thence eastwards to Long Lake, some sixty miles distant.

Assistant Professor Wellington D. Jones of the University of Chicago has returned from his trip to the Far East (see the *Geogr. Rev.*, Vol. 2, 1916, p. 75). The main purpose of the trip was to gain a first-hand knowledge of the essentials of the geography of eastern Asia. Dr. Jones traversed the length of the Japanese Islands from central Yezzo to Kiushiu, Korea from south to north, and southern Manchuria, including the Liaotung Peninsula. In China Dr. Jones went from Peking to Kalgan up onto the edge of the Mongolian Plateau for a few days trip. Dr. Jones then traversed China from north to south from Peking to Canton, with a side trip to Taiyuan in Shansi Province. South of Hankow the route led up the Yangtzekiang and through Tungting Lake and up the Siang River to Changsha, whence Dr. Jones continued overland along the line of the proposed railway. Some work in the delta region of the Sikiang between Canton and Hongkong followed, then a steamer trip from Hongkong to Shanghai and a few days in the Shanghai region of the Yangtzekiang delta.

Mr. Thomas H. Kearney of the Bureau of Plant Industry of the U. S. Department of Agriculture expects to continue during the present summer, in co-operation with Dr. H. L. Shantz of the U. S. Department of Agriculture, the studies of native vegetation as an indicator of the agricultural capabilities of land in the western states which have been in progress during the past five or six years. Detailed investigations of this subject have been made in the Great Plains region (eastern Colorado), in the Great Basin region (Toole Valley, Utah), and in the Southwestern Desert region (Cahuilla Valley, Cal., and Salt River Valley, Ariz.). In all of these localities close correlations have been established between the natural plant associations, the physical characteristics of the underlying soils, and their relative capabilities for crop production under irrigation or by dry-farming methods. Reconnaissance work in other parts of the Great Plains, the Inter-Mountain region, and the Southwestern Desert region have indicated that the correlations worked out in detail in the localities mentioned will hold good over extensive areas with comparatively slight modification. It is believed that these investigations have furnished a method for the rapid and accurate classification of untilled land in the more arid portion of the United States with respect to its possible agricultural value. During the present season these investigations will be continued in southern Arizona and probably in New Mexico, Oregon, and Washington.

DR. DAVID RANDALL-MACIVER, late librarian of this Society, has for some time been at the front with the British Army in Greece.

MR. J. B. TYRRELL, mining engineer of Toronto, at one time connected with the Geological Survey of Canada, expects to spend part of the summer in the mining district north of the Saskatchewan River in Manitoba.

DR. T. WAYLAND VAUGHAN of the U. S. Geological Survey has been in charge during the past year, for the Smithsonian Institution, of the preparation of memoirs to be published as a result of a co-operative arrangement made in 1912 between the U. S. Geological Survey, the Smithsonian Institution, and the Isthmian Canal Commission for the prosecution of geological investigations in the Canal Zone and adjacent areas in Central America. Dr. Vaughan has completed the following monographs: "Corals"; "The Biologic Character of the Sedimentary Formations of the Canal Zone and Adjacent Areas in Central America" (with D. F. MacDonald); and "The Geologic Correlation of the Sedimentary Geologic Formations of the Canal Zone and Adjacent Areas in Central America and Their Bearing on the Geologic History of the Perimeters of the Gulf of Mexico and the Caribbean Sea." As one in this series of publications Dr. D. F. MacDonald, geologist of the Isthmian Canal Commission, has completed a comprehensive monograph on the physiography, stratigraphic, structural, and economic geology of the Canal Zone and adjacent areas.

# GEOGRAPHICAL PUBLICATIONS

## (Reviews and Titles of Books, Papers, and Maps)

*For key to classification see "Explanatory Note" in Vol. II, pp. 77-81*

### NORTH AMERICA

#### UNITED STATES

*General*

BRADLEY, G. D. **The story of the Pony Express: An account of the most remarkable mail service ever in existence, and its place in history.** 175 pp.; ills. A. C. McClurg & Co., Chicago, 1914. 75 cents. 7 x 4½.

Mr. Bradley describes this book as an account of the most remarkable mail service that ever existed. The Pony Express, between the Missouri River and the Pacific Coast, spanned the interval between April, 1860, when the trans-continental telegraph extended to St. Joseph, Missouri, and October, 1861, when it was completed and messages were sent by wire from coast to coast. Previous to this time communication had been only by a semi-monthly steamship service between New York and San Francisco, via Panama, the trip taking four weeks; or by the Butterfield Overland Mail, established in 1858, from St. Louis by way of El Paso and Fort Yuma to San Francisco on a twenty-five day schedule. When it was seen that civil war between the states was inevitable, a great deal of anxiety was felt both in Washington and amongst the loyalists of California over the possible loss of that state to the Union. To avert this and keep the East and West in touch the Pony Express was organized.

The freighting and stage firm of Russell, Majors, and Waddell of Leavenworth, Kansas, deserves the credit for this enterprise, which they planned without Government aid and in realization of the probability of financial loss, a fear that indeed came true. Mr. Bradley estimates the total loss in the year and a half of its service as $200,000, and this in spite of a postal rate of $5 an ounce. The pony riders had normal runs of seventy-five miles, with changes of mounts every ten miles. Including stops, an average speed of ten miles an hour was to be maintained on the summer schedule. Accidents of weather or attacks by Indians, sometimes on the pony riders but more often on the lonely station keepers, frequently interfered with the schedule. To bring the mail in on time in spite of disasters on the road became almost a religious duty. Many riders far exceeded their normal runs. The late Wm. F. Cody is credited with the longest continuous ride, three hundred and twenty-two miles. The regular time of the Pony Express was ten days from St. Joseph to Sacramento, about half the time then required by the Butterfield stage, which continued to be used for passengers, freight, and slower mail. The high rate necessarily charged by the Pony Express caused its use to be confined chiefly to newspapers, large commercial houses, and the United States Government. The British Government also made use of it for communications between London and the Chinese coast. The best record ever made by the express was in March, 1861, when the President's inaugural message was carried from St. Joseph to Sacramento, 1,966 miles, in seven days and seventeen hours.

The author concludes with a well-deserved tribute both to the managers of the Pony Express, who performed a most important service to the country, and to the daring pony riders, who furnish a record of pluck and devotion to an ideal which does them lasting honor, altogether an enduring tribute to American courage and American organizing genius. With no attempt at literary style this book is still a clear and interesting account of an important incident in the development of the United States. R. S. HARVEY.

JONES, G. M. **Ports of the United States: Report on terminal facilities, commerce, port charges, and administration at sixty-eight selected ports.** 431 pp.; maps, diagrs. *Bur. of Foreign and Domestic Commerce, Misc. Ser: No. 33.* Dept. of Commerce, Washington, D. C., 1916.

In view of the interest in port development and water transportation in the United States, this compilation is timely. It brings up to date the official report on this subject in Part III of the "Report on Transportation by Water in the United States," issued by the Bureau of Corporations in 1910.

Mr. Jones visited the ports on the Atlantic Coast, the Gulf of Mexico, and the Great Lakes, and sent an inquiry schedule to the mayors of 576 cities. The ports of which

he writes are those which have a "water-borne commerce," amounting to one million short tons in volume, or $30,000,000 in value, in the calendar year 1913. For each port so described he gives a physical description and details regarding railroads, steamship connections, statistics of the port's commerce, extent and ownership of the water front, terminals, kind of wharf construction, and port charges. Particularly valuable is the collection of maps of the more important ports.

A fault of the book is that it does not get anywhere. It is a great mass of facts, gathered with no apparent purpose in view. The facts are not used to develop any theory of port ownership or port operation. It is not a handbook for engineers, for port authorities, or for shippers. As an economic work, it almost totally disregards the most important factor in the competition of our various Atlantic and Gulf ports, viz., the relative rates to and from the interior points. A port today is a commercial and not a geographical fact. Geographical factors may have determined its locality, but its ability to get and hold business depends upon the inland and ocean rates which it enjoys and the charges which various commercial agencies levy upon goods that pass through it.

The shipper will look in vain for information regarding rate structures, inland and ocean, grain elevation charges, the presence or absence at the seaboard of necessary forwarding agencies at the various ports; and port authorities examining the work will find little guidance as to the question of public versus private ownership of waterfront facilities. This Government report is better than many, but it shares their usual fault of comparative lack of aim and of attainment. EDWIN J. CLAPP.

MARVIN, C. F. **Report of the chief of the Weather Bureau, 1914-1915.** 276 pp.; maps. U. S. Dept. of Agric., Weather Bureau, Washington, D. C., 1916.

It is inevitable that an official Government report, like that of the Chief of the Weather Bureau, should appear a good while after the period of activities and observations which it covers. Nevertheless, there is always much of interest in this report, and those who are working along meteorological or climatological lines may perhaps occasionally need to be reminded of the appearance of this annual volume, and of what it contains. The "Review of Weather Conditions during the Year" summarizes briefly the essential meteorological characteristics, in a compact form, convenient for reference. Four charts show the departure from the normal temperature for the crop season (March 1–Sept. 30); the total precipitation for the crop season; the departure from the normal precipitation for the crop season, and the total precipitation of the year. The monthly amounts of sunshine and the percentages of the possible sunshine, as derived from thermometric recorders, are given for 148 stations. Excessive rainfalls are tabulated in full in another table. The monthly and annual meteorological summaries for 204 stations cover 100 pages. The monthly and annual precipitation is given for all stations (48 pp.), and the monthly and seasonal snowfall for selected stations (53 pp.). Teachers will find abundant material for study and for illustration in the pages of these successive reports. R. DEC. WARD.

BALL, M. W., AND L. W. STOCKBRIDGE. **Petroleum withdrawals and restorations affecting the public domain.** 427 pp.; maps. *U. S. Geol. Survey Bull. 623.* Washington, D. C., 1916.

BEAL, F. E. L., W. L. MCATEE, AND E. R. KALMBACH. **Common birds of southeastern United States in relation to agriculture.** 39 pp.; map, ills. *Farmers' Bull. 755.* U. S. Dept. of Agric., Washington, D. C., 1916.

BEARD, C. A. **Economic origins of Jeffersonian democracy.** ix and 474 pp.; index. The Macmillan Company, New York, 1915. $2.50. 9 x 6.

BLAIR, W. R., AND C. S. WOOD. **Meteorological observations on board the U. S. Coast Guard Cutter "Seneca," April to July, 1915.** Maps, diagrs., ills. *Monthly Weather Rev. Suppl. No. 3*, pp. 13-28. Weather Bureau, Washington, D. C., 1916.

CAPRA, GIUSEPPE. **Le città della Federazione Nord-Americana.** *Boll. della Reale Soc. Geogr. Italiana*, Vol. 5, 1916, No. 9, pp. 737-748.

CARDEN, G. L. **Address on the U. S. Coast Guard and inland navigation.** *Rept. of Proc. of the Eighth Ann. Convention of the Atlantic Deeper Waterways Assoc.*, pp. 147-155. Philadelphia, 1915.

—— **Climatological data for the U. S. by sections, (1) January, (2) March, (3) July, (4) August, (5) September, (6) October, (7) November, 1916; (8) January, 1917 (Vol. 3, Nos. 1, 3, 7, 8, 9, 10, 11; Vol. 4, No. 1).** Maps. *U. S. Weather Bur.* [*Publs.*] *Nos. 573, 578, 593, 595, 597, 601, 576, 608.*

—— **Coal industry of the United States in 1915, The.** Ills. *Mining and Engineering World*, Vol. 44, 1916, No. 6, pp. 274-276.

—— **Copper production in the United States in 1915.** Diagr., ills. *Mining and Engineering World*, Vol. 44, 1916, No. 6, pp. 245-253.

—— **Cyclone in perspective, A.** Map. *Monthly Wealther Rev.*, Vol. 44, 1916, No. 10, p. 581.

DABNEY, A. L. **Mississippi River flood records studied with relation to levee grades: By raising embankment elevations 6 to 7 feet menace from extreme high water would be effectively removed.** Map, diagr. *Engineering Rec.*, Vol. 73, 1916, No. 14, pp. 452-455.

DANA, S. T. **Farms, forests, and erosion.** 28 pp.; ills. *Separate 688 from U. S. Dept. of Agric. Yearbook, 1916.* Washington, D. C., 1917.

DANIELS, G. W. **American cotton trade with Liverpool under the Embargo and Non-Intercourse Acts.** *Amer. Historical Rev.*, Vol. 21, 1916, No. 2, pp. 276-287. [1807 to the war of 1812.]

DEMING, W. C. **Nut growing, a new American industry.** Ills. *Amer. Forestry*, No. 266, Vol. 22, 1916, pp. 99-104.

FANNING, C. E. **Travel in the United States: Twenty-one programs and bibliography.** 31 pp. (Study Outline Ser.) H. W. Wilson Co., White Plains, N. Y., and New York City, 1916. 25 cents. 8 x 5. [By "travel" is meant mental travel. The bibliography is somewhat restricted in range, the same general works doing service as references on the individual sections of the country.]

—— **Geographic Board of the United States: Decisions, Dec. 1915-Feb. 1916.** 6 pp. Washington, D. C., 1916.

GLADDING, E. P. **Across the continent by the Lincoln Highway.** 262 pp.; map, ills. Brentano's, New York, 1915. $1.50. 8 x 5½.

—— **Gold in the United States in 1915, Production of.** Ills. *Mining and Engineering World*, Vol. 44, 1916, No. 6, pp. 234-238.

GRAVES, H. S. **Report of the Forester.** 36 pp. From *Annual Report of Dept. of Agriculture for 1916*, Washington, D. C. [One of the most important government reports, at least from a geographic standpoint, is that of the Chief Forester, whose compact descriptions and statistical tables give one a vast amount of information about the condition of the forests, their relation to grazing, the extent of reforestation, water-power in the valleys, the development of roads and trails, and research problems that tend to extend the usefulness of the forests and the Forest Service. To characterize the report is practically to quote it in its entirety. It is a document of great geographical value which ought to be utilized by every geographer who wishes to make his subject contribute to the broad questions of public service.]

GROVER, N. C., AND J. C. HOYT. **Accuracy of stream-flow data.** *U. S. Geol. Survey Water-Supply Paper 400-D (Contributions to the Hydrology of the United States, 1916*, pp. 53-59). Washington, D. C., 1916.

GROVER, N. C., G. C. STEVENS, AND W. E. HALL. **Surface water supply of the United States, 1914. Part II: South Atlantic and eastern Gulf of Mexico basins.** 66 and xxx pp.; ills., indexes. *U. S. Geol. Survey Water-Supply Paper 382.* Washington, D. C., 1916.

GROVER, N. C., W. G. HOYT, A. H. HORTON, C. C. COVERT, AND C. H. PIERCE. **Surface water supply of the United States, 1914. Part IV: St. Lawrence River basin.** 128 and xxix pp.; ills., indexes. *U. S. Geol. Survey Water-Supply Paper 384.* Washington, D. C., 1916.

HARPER, R. M. **Development of agriculture in the pine-barrens of the southeastern United States.** Map. *Journ. of Geogr.*, Vol. 15, 1916-17, No. 2, pp. 42-48.

HOLMES, C. N. **Earlier transportation in the United States.** Reprint from *Granite Monthly*, Vol. 47, 1915, No. 10, pp. 443-445.

HOUSTON, DAVID. **The national forest enterprises.** *Amer. Forestry*, No. 276, Vol. 22, 1916, pp. 750-752.

HOVERSTAD, T. A. **The Norwegian farmers in the United States.** 31 pp.; ills. Hans Jervell Publ. Co., Fargo, N. D., 1915. 7½ x 5½.

HRDLIČKA, ALEŠ. **Physical anthropology of the Lenape or Delawares, and of the eastern Indians in general.** 130 pp.; maps, diagr., ills. *Bur. of Amer. Ethnology Bull. 62.* Smithsonian Institution, Washington, D. C., 1916.

HULBERT, A. B. **Western ship-building.** *Amer. Historical Rev.*, Vol. 21, 1916, No. 4, pp. 720-733. [On the "first mechanical industry of importance" in the trans-Allegheny country during the first decade of the nineteenth century.]

INGLE, EDWARD. **A year of cotton and other southern crops.** Ill. *Amer. Review of Reviews*, Vol. 52, 1915, No. 2, pp. 199-203.

—— **Iron and steel industry in 1915, The.** Ills. *Mining and Engineering World*, Vol. 44, 1916, No. 6, pp. 266-269.

—— **Lead and zinc industry in the United States.** Diagr., ills. *Mining and Engineering World*, Vol. 44, 1916, No. 6, pp. 254-260.

—— **Lincoln Highway, Progress of.** *Engineering News*, Vol. 75, 1916, No. 14, p. 635.

MCCASKEY, H. D. **Mineral production of the United States in 1914 (summary).** 69 pp. Diagr. *U. S. Geol. Survey [Publ.] 1:A.* Washington, D. C., 1916.

MCSWEENEY, E. F. **Public control of our water-fronts and the obstacles to be overcome.** *Proc. and Papers of the Fourth Ann. Convention of the Amer. Assoc. of Port Authorities*, 1915, Sept. 13-15, pp. 139-163. Los Angeles, Cal.

MERRITT, EUGENE. **The agricultural element in the population.** [*Quart. Publs. of*] *Amer. Statistical Assoc.*, N. S., No. 113, Vol. 15, 1916, pp. 50-65.

—— **Mineral and metal production in the United States in 1915.** *Mining and Engineering World*, Vol. 44, 1916, No. 6, pp. 229-230.

—— **Modernizing Mississippi River transportation: The new steel barges which usher in the revival of traffic on the great inland waterway.** Diagrs., ills. *Scientific American*, Vol. 114, 1916, No. 21, May 20, pp. 531, 539-540.

MOORE, J. H. **Inland waterways from official viewpoints.** 23 pp. Extension of remarks of Hon. J. Hampton Moore of Pennsylvania in the House of Representatives, December 21, 1916. Washington, D. C., 1917.

MORAN, E. L. **The coal traffic of the Great Lakes.** Ills. *Journ. of Geogr.*, Vol. 15, 1916-17, No. 5, pp. 150-159.

MORSE, FREMONT, AND O. B. FRENCH. **Determination of the difference in longitude between each two of the stations Washington, Cambridge, and Far Rockaway.** 40 pp.; maps, diagrs., ills. *U. S. Coast and Geodetic Survey Special Publ. No. 35.* Washington, D. C., 1916.

MOULTON, H. G. **Economic aspects of inland water transportation.** *Journ. of Geogr.*, Vol. 15, 1916-17, No. 3, pp. 73-78; No. 4, pp. 112-116.

OAST, J. W., JR. **The growth of barge traffic and some hindrances thereto.** *Rept. of Proc. of the Eighth Ann. Convention of the Atlantic Deeper Waterways Assoc.*, pp. 197-203.

—— **Our forests in time of war.** *Amer. Forestry*, No. 270, Vol. 22, 1916, pp. 341-344.

—— **Peculiarities of streams in flood.** *U. S. Geol. Survey Press Bull. No. 280*, p. 3. Washington, D. C., July, 1916.

—— **Petroleum industry in the United States, The.** Ills. *Mining and Engineering World*, Vol. 44, 1916, No. 6, pp. 270-272.

PIERCE, R. C. **The measurement of silt-laden streams.** Diagrs. *U. S. Geol. Survey Water-Supply Paper 400-C (Contributions to the Hydrology of the United States, 1916*, pp. 39-51). Washington, D. C., 1916.

## SOUTH AMERICA

### THE GUIANAS, VENEZUELA, COLOMBIA

ROOSEVELT, THEODORE. **A naturalists' tropical laboratory.** Map, ills. *Scribner's Mag.*, Vol. 61, 1917, No. 1, pp. 46-64.

Chiefly narrative and biological in character, this article contains also some interesting and important descriptions in the field of plant and animal geography. Readers of the former *Bulletin* of this Society will recall Angelo Heilprin's enthusiastic account of the tropical jungle in British Guiana (Impressions of a Naturalist in British Guiana, *Bull. Amer. Geogr. Soc.*, Vol. 38, 1906, pp. 536-556). To those interested in tropical forests it may be said that there exist few descriptions as good as this paper contains of the intense struggle for life among the forest trees and plants in the tropics. The following quotation is especially noteworthy and refers to the forest near Kalacoon, British Guiana.

"The trees stand close together, tall and straight, and most of them without branches, until a great height has been reached; for they are striving toward the sun, and to

reach it they must devote all their energies to producing a stem which will thrust its crown of leaves out of the gloom below into the riotous sunlight which bathes the billowy green upper plane of the forest. A huge buttressed giant keeps all the neighboring trees dwarfed, until it falls and yields its place in the sunlight to the most instantly vigorous of the trees it formerly suppressed. Near the streams the forests are almost impassable, so thick is the tangle below; but away from the streams the walking is easier, because only a few bushes and small trees grow in the perpetual shade. To the new-comer one unending wonder is the mass of vines, the lianas, or bush-ropes; everywhere they hang from the summits of the trees, or twist round the trunks, or lace them together. A few kill the trees; most seem to do them no damage. Some are huge, twisted, knotted cables, dragging down the branches around which they are wrapped, and themselves serving as supports for lesser vines that twine around them. Others stretch up, up, as straight and slender as the shrouds of a ship, until they are lost overhead in the green ceiling of interlocked leaf and branch."

The second part of the paper deals with zoölogical observations on the island of Trinidad.

BOLINDER, GUSTAF. **En etnologisk forskningsfärd i norra Columbia, 1914-1915.** Ills. *Ymer*, Vol. 36, 1916, No. 3, pp. 175-193.

BOOY, THEODOOR DE. **Island of Margarita, Venezuela.** Ills. *Bull. Pan American Union*, Vol. 42, 1916, No. 4, pp. 531-546. [The aridity of the greater part of the island turns the attention of the inhabitants to the sea as a source of livelihood, a geographic response suggesting comparison with the Bahamas. As of old, the pearl fisheries still constitute the most valuable industry, though signs of their exhaustion are apparent.]

CHERRIE, G. K. **A contribution to the ornithology of the Orinoco region.** *Science Bull.*, Vol. 2, 1916, No. 6, pp. 133-174. Museum of Brooklyn Inst. of Arts and Sciences.

HUFFNAGEL, G. E. **De tragedie der verscheping van de Surinaamsche bacoven.** *Tijdschr. voor Econ. Geogr.*, Vol. 7, 1916, No. 5, pp. 181-196.

KNOBEL, F. M. **Suriname.** *Tijdschr. voor Econ. Geogr.*, Vol. 7, 1916, No. 10, pp. 490-494.

MASON, C. T. **The mighty cataract of Kaieteur.** Ills. *Dun's Rev.: Internatl. Edit.*, Vol. 27, 1916, No. 3, pp. 47-48.

MELL, C. D. **The greenheart of commerce.** Ills. *Amer. Forestry*, No. 269, Vol. 22, 1916, pp. 288-291. ["Greenheart is known to occur in British, Dutch, and French Guianas and in parts of eastern Venezuela. The reports that this tree is found in Brazil and in Colombia have not yet been authenticated, but it is quite likely that it grows in Brazilian Guiana near the mouth of the Amazon."]

—— **World's neglected larder, The: It lies at the threshold of New York.** Ills. *The South American*, Vol. 4, 1916, No. 5, p. 111. [The pasture lands of Colombia and Venezuela. See also Walter Lefferts: The Cattle Industry of the Llanos, *Bull. Amer. Geogr. Soc.*, Vol. 45, 1913, pp. 180-187.]

### PARAGUAY, URUGUAY, ARGENTINA, CHILE

GRUBB, W. B. **A church in the wilds.** Edit. by H. T. Morrey Jones. xv and 287 pp.; maps, ills., index. E. P. Dutton & Co., New York, 1914. 8 x 5½.

The geographical content of this volume is largely identical with that of the author's earlier work, "An Unknown People In An Unknown Land" (reviewed in the *Bull. Amer. Geogr. Soc.*, Vol. 43, 1911, p. 458). Interest however is concentrated, as the title suggests, more strongly upon religious aspects. The introductory chapter emphasizes the unique circumstances in which the mission is placed. When the first workers entered, the Paraguayan Chaco was an unexplored country inhabited by independent savage tribes regarding whom most unpleasant traditions existed. The first mission station was within "sound of the whistle of the modern mail steamer on the River Paraguay," yet for all practical purposes it was hundreds of miles from civilization. The entire region is scantily populated. In the area claimed by Paraguay there are perhaps 30,000 to 35,000 people, but the Bolivian frontier is still undefined, and, if the claims of Bolivia are recognized, the number is reduced to not more than 20,000, embracing the Lengua-Mascoy, the Suhin, and three minor tribes. Even this scant population of roughly less than one person to two square miles is diminishing except among the Indians directly connected with the mission. The improvement among the mission Indians is largely due to a determined campaign against the custom of infanticide, a practice natural enough among a nomadic people in a land of limited and uncertain resources. Consideration of the destiny of the Chaco tribes forms an appropriate conclusion to the volume. The

question is becoming acute, for civilization in the form of exploitation of *quebracho* forests, of sugar plantations, and of cattle ranches is fast approaching, especially from the Argentine. One of the great problems of such advance is that of the labor supply. If properly treated the Chaco Indian proves a good workman, and the incoming race should consider his preservation from an economic as well as an ethical standpoint.

ABELLA, ARTURO. **Dairying in Uruguay.** *Monthly Bull. of Agric. Intelligence and Plant Diseases,* Vol. 7, 1916, No. 5, pp. 629-637. Internatl. Inst. of Agric., Rome.

ALBES, EDWARD. **Punta Arenas, the world's southernmost city.** Ills. *Bull. Pan American Union,* Vol. 42, 1916, No. 4, pp. 465-479. [Punta Arenas, boasting 13,000 inhabitants, has quadrupled in size during the last two decades. Expansion has followed the great ovine development in Magallanes: 35 years ago the territory possessed only 185 head of sheep, now they are estimated at over 2,000,000. Wool is the principal export, accounting for more than half of the five million dollars' worth of Chilean exports. Refrigerated and canned meats, the output of three potting and refrigerating plants, account for nearly half of the remainder. Timber sent to Argentina or to the Falkland Islands is also assuming some importance on the export list. In addition, Punta Arenas ships produce for the contiguous Argentine territory.]

ARAÚJO, ORESTES. **Geografía económica del Uruguay.** xi and 216 pp.; ills. A. Monteverde y Cía, Montevideo, 1910. 8 x 5½.

—— **Argentina, República, Memoria del cónsul general de Chile en la, correspondiente al año 1915.** *Bol. de Relaciones Exteriores No. 64,* pp. 33-53. Santiago de Chile, 1916.

—— **Argentine, The population of the.** *Amer. Review of Reviews,* Vol. 54, 1916, No. 4, p. 451. [Review of an article on this topic (the ethnic character of the population) by José Ingenieros in the *Revista de Filosofía,* Buenos Aires.]

—— **Argentine foreign trade, Route of.** *South Amer. Journ.,* Vol. 80, 1916, No. 24, pp. 484-485.

—— **Argentine Republic, The.** 82 pp. Guaranty Trust Company of New York, 1916. 7 x 5. [One of a series of pamphlets on foreign trade issued by this company.]

BEDER, ROBERTO. **Estudios geológicos e hidrogeológicos en los alrededores de Villa Dolores (provincia de Córdoba).** 37 pp.; maps, diagrs., ills. *Bol. Direcc. Gen. de Minas, Geol., e Hidrol. No. 14, Ser. B (Geol.).* Minist. de Agric., Buenos Aires, 1916. [Villa Dolores lies west of the Sierra de Córdoba on the border of the arid region comprised by the provinces of Mendoza, San Luis, and La Rioja. Geological and hydrographical sketch maps and sections illustrate the project for irrigation dependent on the proposed dam of La Viña in the Rio de los Sauces.]

BEDER, ROBERTO. **Los yacimientos de los minerales de wolfram en la República Argentina.** 31 pp., map, bibliogr. *Bol. Direcc. Gen. de Minas, Geol., e Hidrol. No. 12, Ser. B. (Geol.).* Minist. de Agric., Buenos Aires, 1916. [With a bibliography and a map showing the terrane of the Pampean Sierras and the associated deposits of wolframite.]

BODENBENDER, GUILLERMO. **El Nevado de Famatina.** Diagrs. *Bol. Acad. Nacl. de Ciencias en Córdoba (República Argentina),* Vol. 21, 1916, pp. 100-182. Buenos Aires. [This study is a continuation of the geological investigation carried on by the author in the southern part of the province of La Rioja. The Nevado de Famatina (29° S.) is the culminating height (19,700 feet) of the Sierra de Famatina, which runs in a north-to-south direction through Catamarca and La Rioja from the *altiplanicie* of Atacama. With the great development of cretaceous eruptive material are associated the famous mineral deposits of this part of the Sierra. The author precedes his detailed geological description with a chapter on topography, vegetation, distribution of population, and local mining conditions.]

—— **Boletín mensual, Mayo de 1916 (Vol. 1, No. 5),** 44 pp.; maps, diagrs. Oficina Meteorol. Nacl., Buenos Aires, 1917.

BRÜGGEN, J. **Informe sobre el carbon submarino en la costa de la provincia de Arauco.** 7 pp. *Soc. Nacl. de Minería,* Santiago de Chile, 1914.

BRÜGGEN, J. **La formación de los carbones de piedra, especialmente de los chilenos.** 39 pp.; map, diagrs. Soc. Imprenta-Litografía "Barcelona," Santiago-Valparaíso, 1916. [The coal of Arauco is of Tertiary (late Oligocene and Miocene) age. Its formation appears to have taken place under conditions analogous to those governing the genesis of the peat deposits of Holland.]

CARDOSO, ANÍBAL. **El Río de la Plata desde su génesis hasta la conquista.**

Maps, diagrs. *Anal. del Museo Nacl. de Hist. Nat. de Buenos Aires*, Vol. 27, 1915, pp. 153-284. Buenos Aires. [Abstracted in the January *Review*, pp. 70-71.]

CAZOTTE, J. V. **Memoria anual del cónsul de Chile en Salta correspondiente al año próximo pasado.** *Bol. de Relaciones Exteriores No. 65*, pp. 23-33. Santiago de Chile, 1916.

—— **Chile, Anuario estadístico de la República de: Vol. 1, Demografía, año 1914,** xv and 92 pp.; **Vol. 3, Política y administración, año 1914,** 168 pp.; **Vol. 8, Industrias, año 1914,** 52 pp.; **Vol. 9, Comercio y comunicaciones, 1a Parte—Movimiento marítimo, año 1914,** vii and 113 pp.; **Vol. 10, Agricultura, año 1914-15,** 308 pp. Oficina Central de Estadística, Santiago de Chile, 1915, 1916.

—— **Chile, Estadística comercial de la República de, año 1915.** xxi and 333 pp. Oficina Central de Estadística, Valparaiso, 1916.

—— **Chile, Statistical synopsis of the Republic of.** 107 pp.; maps, diagrs. Oficina Central de Estadistica, Santiago de Chile, 1916.

DAVIS, W. G. **Argentine Meteorological Service: History and organization, with a condensed summary of results.** 181 pp.; maps. Buenos Aires, 1914. [In Spanish and English.]

DOERING, ADOLFO, AND P. G. LORENTZ. **Recuerdos de la expedición al Rio Negro (1879).** *Bol. Acad. Nacl. de Ciencias en Córdoba (República Argentina)*, Vol. 21, 1916, pp. 301-386. [The authors accompanied the military expedition that opened up the Argentina South; the former as zoölogist, the latter as botanist. Shortly after the return of the expedition the scientific results were published in part *(Actas de la Academia Nacional de Ciencias*, Vol. 3) but lack of funds prevented completion. The diary, with observations upon the surficial geology, hydrography, and vegetation here appears for the first time.]

DOERING, OSCAR. **Observaciones magnéticas efectuadas fuera de Córdoba durante el año 1899.** *Bol. Acad. Nacl. de Ciencias en Córdoba (República Argentina)*, Vol. 20, 1915, pp. 1-96. Buenos Aires.

DOERING, OSCAR. **Observaciones magnéticas efectuadas fuera de Córdoba en los años 1901, 1902 y 1903.** *Bol. Acad. Nacl. de Ciencias en Córdoba (República Argentina)*, Vol. 20, 1915, pp. 113-150. Buenos Aires.

DOERING, OSCAR. **Observaciones magnéticas efectuades fuera de Córdoba en el año 1904.** *Bol. Acad. Nacl. de Ciencias en Córdoba (República Argentina)*, Vol. 20, 1915, pp. 235-294. Buenos Aires.

—— **Estadística minera de la República: (1) año 1912,** 34 pp.; **(2) año 1913,** 52 pp.; **(3) año 1914,** 51 pp.; diagrs. in all. *Bol. Direcc. Gen. de Minas, Geol., e Hidrol., Ser. A (Minas), Nos. 4, 5, 7.* Minist. de Agric., Buenos Aires, 1915, 1915, 1916.

FELSCH, JOHANNES. **Informe preliminar sobre los reconocimientos jeolójicos de los terrenos petrolíferos de Magallanes del Sur, Diciembre de 1915 a Junio de 1916.** Map, diagrs. *Bol. Soc. Nacl. de Minería*, No. 223, Vol. 28, 1916, pp. 214-223; No. 224, pp. 309-314. Santiago de Chile. [With a black-and-white geological map, 1:250,000, of the Strait of Magellan region.]

FURLONG, C. W. **The people of Tierra del Fuego.** Ills. *Travel*, Vol. 27, 1916, No. 5, pp. 25-28. [See the same writer's articles on this topic in the *Geogr. Rev.* for January and March, 1917.]

GOEHRING, MAURIZIO. **La yerba mate o thè del Paraguay e l'alto suo valore nutritivo.** *L'Esplorazione Commerc.*, Vol. 31, 1916, No. 4, pp. 121-126.

HOSSEUS, C. C. **La difusión geográfica de Araucaria imbricata R. et P.** *Bol. Acad. Nacl. de Ciencias en Córdoba (República Argentina)*, Vol. 20, 1915, pp. 351-361. Buenos Aires.

HOSSEUS, C. C. **Observaciones arquelógicas en el río Blanco (San Juan).** Ills. *Anal. del Museo Nacl. de Hist. Nat. de Buenos Aires*, Vol. 28, 1916, pp. 145-151.

KEENA, L. J. **Chile.** 12 pp. *Suppl. to Commerce Repts.*, Ann. Series, 1916, No. 41a. Bur. of Foreign and Domestic Commerce, Dept. of Commerce, Washington, D. C. [Closing of the Panama Canal and high freight rates through the Straits of Magellan seriously handicapped both export and import trade. "Some idea of the difference in the cost of carrying merchandise via the Straits and via the Canal may be gathered from the present cost of a time charter—say $1,500 per day for a steamer loading 10,000 tons—and the fact that via the Canal the running time from east-coast ports to Chile would be 20 days, as compared with 45 days via the Straits, and that to the daily charter cost must be added all fuel and operation expenses."]

KURTZ, FEDERICO. **Essai d'une bibliographie botanique de l'Argentine.** *Bol. Acad. Nacl. de Ciencias en Córdoba (República Argentina)*, Vol. 20, 1915, p. 369. Buenos Aires. [An addendum to the edition of 1912.]

LEHMANN-NITSCHE, ROBERT. **Noticias etnológicas sobre los antiguos patagones recogidas por la expedición Malaspina en 1789.** *Bol. Acad. Nacl. de Ciencias en Córdoba (República Argentina)*, Vol. 20, 1915, pp. 103-112. Buenos Aires. [The records of Malaspina's world voyage of 1789-1794, published in 1885, lacked the observations on the Patagonian littoral, the manuscripts for which are preserved in the British Museum. These, containing notices upon the manners and customs of the ancient Tehuelches, are here reproduced.]

## EUROPE

### SCANDINAVIA, INCLUDING FINLAND

BOHEMAN, EZALINE, edit. **Svenska Turistföreningens Årsskrift. 1915:** xvi and 452 pp.; map, diagrs., ills. **1916:** 450 pp.; map, ills. Wahlström & Widstrand, Stockholm, 1915 and 1916. 4 kr. each. 8½ x 5½.

The attractions of Sweden as a tourist country are not yet so well known to the outside world as those of its sister country, Norway, but within Sweden itself the Tourist Association has guided the stream of summer travelers to seek out the beauties of their homeland. The two yearbooks of the Association are thick books containing hundreds of beautiful illustrations and much useful information presented in readable form. They point the way to what might be done in America if the "See America First" movement could be as well organized. The report for 1915 marks the thirtieth anniversary of the association and recapitulates its aims and methods. Being non-commercial in character, the association has no interest in steering travelers to the most expensive routes and hotels, but tries rather to interest young people in making inexpensive tours requiring some physical effort and hardihood. It works by means of books, pamphlets, exhibitions of photographs, lectures, school exhibits, and illustrated tourist guides. Twenty-five tourist stations are maintained in various parts of the country. The income of the association is derived from the sale of its publications and the dues of its members, who in 1916 numbered upward of 60,000. It has an annual budget of about $70,000.

The yearbook for 1915 devotes much of its space to Uppland, a region rich in historic associations and including the capital, Stockholm, and the chief university town, Upsala, built on the site of the old heathen sacrifices. Besides practical directions for short trips, there are special chapters devoted to the history of Upsala, its prehistoric relics, the famous castles in the neighborhood, the quaint bell-towers so frequently found beside the churches, the arts and crafts of the district, and a sketch of the people.

The yearbook for 1916 gives the place of honor to Småland, a tract lying between the Baltic and the great inland lake, the Vettern. The introductory chapter is signed by no less famous a name than that of Ellen Key, who spent her childhood in Småland. The volume contains, along with much other interesting matter, a description of Karungi, Sweden's gateway to the east, which has sprung into prominence during the war.

HANNA ASTRUP LARSEN.

HARVEY, W. J., AND CHRISTIAN REPPIEN. **Denmark and the Danes: A survey of Danish life, institutions, and culture.** 346 pp.; map, ills., index. T. Fisher Unwin, Ltd., London [1915]. 8s. 9 x 6.

This volume well fulfills the promise of its comprehensive title. It is a veritable encyclopedia, showing contemporary Denmark on a background of its history, racial development, and the physical aspects of the country. We find that the achievements of Danish farmers in the last half century are by no means to be accounted for by especially favorable conditions of nature. On the contrary, the land as a whole is not fruitful, and the tillable area is reduced by the immense stretches of boggy heath in Jutland. Along the western coast there are sand dunes extending for two hundred miles and five or six miles wide. There are on an average 156 days of rain and snow in the year, 94 days of fog and mist, and only 1,200 hours of sunshine.

The success of the farmers in the face of adverse conditions the authors attribute to the character of the people, their capacity for hard work and sustained effort, and their readiness to throw aside traditional methods. The Society for the Cultivation of the Heath, with a subsidy from the state, has reduced the unproductive area from 2,200 to 900 square miles. Wise legislation has split up the country into small freeholds, until one half of the area of Denmark is taken up by farms of between 38 and 150 acres. To enable families to live on such small acreage, the Government has encouraged

intensive farming. It lends money to the small holder on easy terms, gives stipends for study abroad, and maintains the Copenhagen High School of Scientific Agriculture with a thorough course extending from two and a half to four years. This is the headquarters of scientific farming in Denmark, from which lecturers and inspectors go out to the farmers, and where experiments bearing on every phase of farming are made.

The scientific precision with which dairying is carried on in Denmark, from the artificially cooled milk-pail to the dustless crane that delivers the cheapest and most wholesome milk in the world to the consumer, would be an object lesson to the slipshod methods of milk distribution in our large cities. The disadvantages of small farms are counteracted by the co-operative societies that give the individual farmer all the benefits of production on a large scale. Collective marketing insures fair prices; the elimination of the middle-man adds to the farmer's profit, and a uniform high grade of product is insured. The first co-operative dairy was opened in Jutland in 1882, and was soon followed by others. Now there are 1,200 such dairies, owning more than a million cows. The immense increase in the finest agricultural products has naturally given great stimulus to the foreign trade of Denmark; butter, cheese, eggs, and meat are exported, while fodder and manufactured products are imported. HANNA ASTRUP LARSEN.

TANNER, V. **Studier öfver Kvartärsystemet i Fennoskandias nordliga delar. III: Om Landisens rörelser och afsmältning i Finska Lappland och angränsande Trakter.** ix and 815 pp.; maps, diagrs., ills., bibliogr. *Bull. de la Commission Geol. de Finlande No. 38.* Helsingfors, 1915.

The region embraced in this report lies entirely north of the Arctic Circle, and the principal map covers parts of Norway and Sweden as well as northern Finland and adjacent parts of Russia to the east. It covers the mainland from about the 17th to the 33d meridian east of Greenwich. The author spent about ten field seasons in this region. The report also embraces the main results of studies by other geologists, some of which had not been published. It presents therefore a comprehensive statement of the existing knowledge of the Quaternary deposits and features of the region. The résumé in French is sufficiently full to give the reader a clear understanding of the contents of the volume.

There is space in this review merely to outline the topics discussed, and to state that the discussion is clear and full. The illustrations also are well calculated to make clear the descriptions.

The first part, pages 12-144, discusses the manner in which the ice spread over the region, as indicated by transport of rock materials, by striae and *roches moutonnées*. The author thinks it probable that the ice extended beyond the land limits and formed shelf ice like that on the border of Antarctica.

The second and longer part deals with the ice recession. It goes fully into the description of moraines and gives several classes, terminal, radial, lateral, and the "Moränbacklandskap." Considerable attention is given to glacial lakes held up by ice dams, and the maps show their distribution, and their relations to the ice and to present drainage. The former extension of marine waters is also discussed.

FRANK LEVERETT.

ÅKERBLOM, F. **Bulletin mensuel de l'Observatoire Météorologique de l'Université d'Upsala.** Vol. 47, 1915, pp. 1-74. Upsala, 1915-16.

ANDERSSON, GUNNAR. **Nya svenska kartverk.** Maps. *Ymer*, Vol. 36, 1916, No. 1, pp. 1-14.

ERKES, HEINRICH. **Neue Beiträge zur Kenntnis Inner-Islands.** Ills. *Mitt. des Vereins für Erdkunde zu Dresden*, Vol. 2, 1914, No. 9, pp. 989-1040. [See the reference to the writer's previous work in Iceland in the March, 1917, *Geogr. Rev.*, p. 213.]

EKMAN, SVEN. **Die Bodenfauna des Vättern, qualitativ und quantitativ untersucht.** Map, diagrs., ills., bibliogr. *Internat. Revue der gesamten Hydrobiol. und Hydrogr.*, Vol. 7, 1915, No. 2-3, pp. 146-204; No. 4-5, pp. 275-425. [Lake Vettern in southern Sweden.]

GRANLUND, ERIK. **Borlänge: En egenartad svensk stadstyp.** Maps. *Ymer*, Vol. 36, 1916, No. 1, pp. 39-44. [This small town in 60½° N. and 15½° E. constitutes a unique type of city.]

HATT, GUDMUND. **Agervandingen i Gudbrandsdalen.** Diagrs., ills. *Geografisk Tidskrift*, Vol. 23, 1915-16, No. 4, pp. 148-158. [On irrigation in the main transverse valley-trough of Norway.]

JÓNSSON, FINNUR. **Topografiske beskrivelser i Sagaerne og deres betydning.** Maps. *Oversigt over det Kgl. Danske Videnskabernes Selskabs Forhandlinger*, 1915,

No. 6, pp. 525-537. Copenhagen. [On the authenticity of the facts related in the Sagas judged by the topographical description contained in them.]

JUHLIN-DANNFELT, H. **The present state of agriculture in Sweden.** *Monthly Bull. of Agric. Intelligence and Plant Diseases,* Vol. 7, 1916, No. 7, pp. 921-932. Internatl. Inst. of Agric., Rome.

—— **Magnetisk Aarbog (Annuaire Magnétique), 1913:** 8 pp.; **1914:** 11 pp. Diagrs. in each. Publ. fra det Danske Meteorol. Inst., Copenhagen, 1915 and 1916.

—— **Statens järnvägar under År 1915: Preliminär redogörelse.** 105 pp.; diagrs. *Järnvägsstatistiska Meddelanden,* Vol. 4 (Series D), Extrahäfte. Kungl. Järnvägsstyrelsen, Stockholm, 1916.

STÖRMER, CARL. **Preliminary report on the results of the Aurora-Borealis Expedition to Bossekop in the spring of 1913. (Fourth communication.)** Maps, diagrs., ills. *Terrestr. Magnet. and Atmospher. Electr.,* Vol. 21, 1916, No. 2, pp. 45-56.

—— **Sverige, Statistisk Årsbok för, Tredje Årgången, 1916.** x and 365 pp. Kungl. Statistiska Centralbyrån, Stockholm, 1916.

THORODDSEN, T. **Vulkanske udbrud i Vatnajökull paa Island.** *Geografisk Tidskrift,* Vol. 23, 1915-16, No. 4, pp. 118-132.

WRÅK, WALTER. **Resultatet av floderosionen inom Skandinavien sedan sista interglacialtidens slut.** Diagr., ills. *Ymer,* Vol. 36, 1916, No. 3, pp. 215-267.

## AFRICA

### South Africa

ALSTON, MADELINE. **From the heart of the veld.** xii and 253 pp. John Lane Company, London, New York, 1916. 5s. 8 x 5.

The author lived with her family on the veld, or grassland, of inner South Africa. She liked the life, finding nothing lonely or dull on a veld farm, for she was keenly interested in many phases of the novel nature around her. There is not a dull page in the book; and it is worth reading, most of all because the author has a touch of the gift that made the descriptions of Olive Schreiner so vivid and true a picture of life on the veld. One diversion from her main theme is excusable, for it shows how much the books she loved best helped to enrich her years in this vast and lofty wilderness. The family took leisurely trips to most parts of South Africa, and the author briefly compares and contrasts regions and towns and tells what each stands for in relation to human well-being.

BEWS, J. W. **An account of the chief types of vegetation in South Africa, with notes on the plant succession.** Diagr., bibliogr. *Journ. of Ecology,* Vol. 4, 1916, No. 3-4, pp. 129-159.

The geographical essentials of this report may be summarized by two quotations (pp. 156-157): "There are few countries that can show more varied types of vegetation than South Africa. There is every stage from desert and open edaphic formations, through every gradation of open, semi-open and closed steppe, through great variety of sclerophyllous and other scrub to a mesophytic type of evergreen bush, while along the coast there are psammophilous bush and mangrove types. The succession is not always toward the mesophytic, as is shown by the presence of succulent scrub in the dry river valleys. Tree veld of various kinds—an intermediate type between grassland and forest—covers enormous areas and may represent an early stage of succession to a xerophytic type of bush, which retains its present character through the influence of grass fires.

"One striking feature of the vegetation as a whole is the rarity of formations or associations dominated by a single species. The macchia and heath formations, scrub of various kinds, most of the bush, much of the veld and tree veld, the Karroo and psammophilous bush of the coast, are all made up of a conglomeration of species. In the closer formation masses and clumps or tussocks, consisting of half a dozen species with their branches completely intertwined and commingled, are a common feature. There are, however, a few exceptions to this." . . . . .

"In many cases, the fact that no single species has been able to assume dominance may be considered to point to a lack of stability in the environmental conditions, but it is doubtful if this is sufficient to explain all the facts. *Leucosidea* scrub is an unstable type and yet it is often pure. The wattle tree, *Acacia mollissima,* a native of Australia, large plantations of which are now a feature of the landscape in Natal, is quite at home and in places, e. g. in the Harding district, is spreading naturally. Among

the wattle, hardly any native species is able to exist. There is no undergrowth of any kind. An introduced species therefore is apparently able to assume complete dominance, while our native species of trees are not. This, however, is not apparent in the case of introduced weeds, with one or two exceptions. The vegetation of South Africa, as a whole, is resistant to invaders."

The paper closes with an interesting figure which shows schematically the relationships between the various types of South African vegetation.

EVELEIGH, WILLIAM. **South-west Africa.** ix and 260 pp.; bibliogr., index. T. Fisher Unwin, Ltd., London [1915]. 5s. 7½ x 5.

A clear and careful summary of leading facts relating to the land, climate, fauna, flora, economic resources, and the white and native population of the country. When the German government acquired a foothold, in 1883, this was believed to be one of the most unpromising parts of Africa. Mr. Eveleigh presents the facts, now well established, showing that the country, on the contrary, is desirable for the variety and extent of its resources and for other natural inducements it offers to white men and women to make homes there. After years of war with the natives, the German colony made much material progress and, best of all, became the home of many contented German farmers. When the European war began, there were 1,625 white children in the country, most of them born there of mothers who had come from Germany to marry Germans who were developing small farms or ranches or had found work in the towns and mining districts. This, as Mr. Eveleigh says, was a healthful sign, showing that conditions were improving and that the life of the people was becoming stable.

The book discusses Southwest Africa simply as a region where a considerable though not dense white population may be healthy and enjoy fair prosperity. Minerals, pastures, and agricultural lands are the three natural sources of wealth. The minerals are first in importance. The diamond fields, near the sea, where gems are dug out of the unconsolidated sands, may not be exhausted for twenty years. How the diamonds got there is not known, but the most favored theory is that of Dr. Wagner, who concludes that the parent rock of the diamonds lies submerged off the present coast. Copper ores bid fair to yield large quantities of the metal for many years. Tin and marble seem likely to become important. The country has great stock-raising possibilities; and Dr. Rohrbach estimates that the grazing lands can carry 3,000,000 cattle and 2,000,000 sheep and goats; but the pasturage is thin, and a stock farm, to give adequate return, should contain at least 20,000 acres.

The book is conservative, scientific, and readable. It is, thus far, the best general description in English of this region. An excellent account of the physical geography appeared in 1916 in P. A. Wagner's "The Geology and Mineral Industry of South-west Africa," reviewed in the August, 1916, *Geogr. Rev.* (Vol. 2, pp. 155-156).

CYRUS C. ADAMS.

—— **Lourenço Marques. A year book of information regarding the town and port of: The Delagoa directory, 1916.** 205 pp.; ills., index. A. W. Bayly & Co., Lourenço Marques, 1916. 2s. 6d. 8½ x 5½.

This port, with the largest and best harbor in Africa, had little part in African trade till the Transvaal railroad system was linked up with it. Portugal since then has given Lourenço Marques due attention. Swamps have been drained to the great improvement of the public health. Commodious government buildings have been erected, and twelve large steamships can tie up at the same time, with every convenience at the docks for handling freight. The Transvaal supplies most of the trade; but while the Transvaal imports about half of its foreign commodities through Lourenço Marques, nearly all its exports are sent to Cape Colony shipping points. The tidal rise and fall is 11 feet at spring tide, which is a slight inconvenience.

CYRUS C. ADAMS.

ALVARES, P. A. **O regime dos prazos da Zambezia.** *Bol. Soc. de Geogr. de Lisboa*, Ser. 34, 1916, No. 4-6, pp. 137-213.

BASCHIN, O. **Die Huibhochfläche in Südwestafrika.** *Die Naturwissenschaften*, Vol. 4, 1916, No. 10, pp. 128-129. [Abstract of two lectures before the Berlin Geographical Society on Feb. 5, 1916.]

BOYES, C. E. **Basutoland: Report for 1915-16.** 17 pp. *Ans. Colonial Repts. No. 911.* London, 1916.

EVANS, M. S. **A survey of the past and present relations of the European and Bantu races in Natal and surrounding territories.** *South African Journ. of Sci.*, Vol. 13, 1916, No. 3, pp. 117-128.

FRIES, R. E. **Vegetationsbilder aus dem Bangweologebiet (Nordost-Rhodesia).** 20 pp.; ills. *Vegetationsbilder, herausgegeben von G. Karsten und H. Schenck*, Ser. 12, No. 1. Gustav Fischer, Jena, 1914.

HOLLAND, R. S. **Report to the Board of Trade on the trade of the Union of South Africa (and Rhodesia) for the year 1913.** 78 pp. London, 1914. [Trade statistics and analysis are preceded by paragraphs relative to the all-important labor question. The findings of the Economic Commission (of 1913) are quoted, and attention is directed to the particular problems presented by the "Cape colored" man and by the coolie of Natal.]

JACKSON, G. F. T. **The Hex River Mountains, Cape Colony.** Ills. *Alpine Journ.*, No. 211, Vol. 30, 1916, pp. 44-47.

JOLLIE, E. (C.). **The back of beyond in Rhodesia.** *United Empire*, Vol. 7, N. S., 1917, No. 12, pp. 769-775. [The little-known Gazaland.]

MACDONELL, ——. **Report on the trade and commerce of Lourenço Marques and other Portuguese possessions in East Africa for the year 1914.** 60 pp. *Diplomatic and Consular Repts., Ann. Series, No. 5558*, London, 1916. [See note in the May, 1916, *Review* (Vol. 1, p. 376).]

—— **Nyasaland: Report for 1915-16.** 11 pp. *Ann. Colonial Repts. No. 919.* London, 1917.

SUTTON, J. R. **South African coast temperatures.** *Quart. Journ. Roy. Meteorol. Soc.*, No. 178, Vol. 42, 1916, pp. 107-111 (discussion, p. 111). [The paper calls attention to the abnormal lagging of the winter maximum at the stations of East London and Cape St. Francis. An important influence is attributed to the churning of the coast waters by the characteristic and violent spring gales experienced off the southeast coast.]

## MATHEMATICAL GEOGRAPHY

### CARTOGRAPHY

HUTCHINSON, H. D. **Military sketching made easy and military maps explained.** Seventh edition. Revised and brought up to date by R. F. Pearson. xvi and 230 pp.; maps, diagrs. Gale & Polden, Ltd., London, 1916. 4s. 7 x 5.

In the seventh edition of this popular army manual, the work has been completely revised to agree with the latest official textbooks on the subject. A chapter has been added on the subject of military freehand drawing. Though all technicalities have been avoided, the treatment is very complete and includes all points with which a line officer should be familiar. An excellent feature is the collection of numerous good examples and problems to explain every phase of the subject. Colored plates and numerous diagrams fully illustrate the book without preventing it from being sold at a very reasonable price.

JAMES GORDON STEESE.

LEGGE, R. F. **Military sketching and map reading for non-coms. & men.** viii and 78 pp.; maps, diagrs. Gale & Polden, Ltd., London, 1916. 1s. 6d. 7 x 5.

The present war has brought out a number of books to supply the pressing needs of the new levies. In this work the author has endeavored to include "everything that a noncommissioned officer could possibly be expected to know about military sketching or map reading, and to arrange it all so simply that a man with no previous knowledge of either subject could readily understand those things dealt with." The treatment, though elementary, is excellent, especially those sections devoted to scales and to descriptions of instruments used in sketching. Though inexpensively produced and sold at an absurdly low price, the book is adequately illustrated, many plates being in color.

JAMES GORDON STEESE.

MOCKLER-FERRYMAN, A. E. **Military sketching, map reading, and reconnaissance.** Second edition. xi and 202 pp.; maps, diagrs., ills., glossary, index. Edward Stanford, London, 1911. 5s. 7½ x 5.

Colonel Mockler-Ferryman's textbook is intended for the beginner, but he hopes "that it contains sufficient information to enable any officer to pass the required examinations up to the rank of Lieutenant Colonel." It is an excellent work, complete and progressive in treatment, and should be of great value in training the recent levies in military topography,

The first twelve chapters are devoted to sketching, two chapters to map reading, two to reconnaissance, and the final chapter to marching on compass bearings. In the

four appendices are found reconnaissance notes and memoranda, a description of useful instruments and sketching accessories, and practical hints on examination questions. The typography is excellent. On the cover is a scale of inches.

To pace yards requires considerable effort, especially on uneven ground, and distracts one's attention. Since special pace or time scales must be made for mounted work, it would be better for a sketcher to make a scale of his natural paces and paste or scratch it on his alidade. A piquet location is referred to as 3-4 mile S. by E. of the *T* in DAINTREE PARK. A reference to a natural feature *on the ground* would be preferable.

JAMES GORDON STEESE.

PEARSON, R. F. **Military panorama drawing in three lessons, and notes on hand sketches, panoramas from maps, maps from panoramas.** 18 pp.; diagrs. Gale & Polden, Ltd., London, 1914. 1s. 6d. 7 x 5.

An excellent little book giving in six pages sufficient directions for making a satisfactory hasty military panorama sketch. In the following pages are given some notes on hand sketches, panoramas from maps, and maps from panoramas. Illustrations show successive stages in the development of the sketches. JAMES GORDON STEESE.

EGERER, A. **Die Kartographie auf der Internationalen Ausstellung für Buchgewerbe und Graphik in Leipzig 1914.** *Zeitschr. für Vermessungswesen*, Vol. 43, 1914, No. 27, pp. 681-696. Stuttgart.

JONES, E. L. **Elements of chart making.** 15 pp.; maps, diagrs., ills., bibliogr. *U. S. Coast and Geodetic Survey Special Publ. No. 38.* Washington, D. C., 1916.

NALLINO, C. A. **Un mappamondo arabo disegnato nel 1579 da 'Alî ibn Ahmad al-Sharafî di Sfax.** Map. *Boll. della Reale Soc. Geogr. Italiana*, Vol. 5, 1916, No. 9, pp. 721-736.

PARTSCH, J. **Die Internationale Weltkarte in 1:100,000: Ein Rückblick—ein Ausblick.** *Mitt. der Gesell. für Erdkunde zu Leipzig*, 1913, pp. 80-98.

WHITEHOUSE, W. E. **Military map reading classes.** *Geogr. Teacher*, No. 43, Vol. 8, 1915, Part 3, pp. 184-188.

## HUMAN GEOGRAPHY

### ANTHROPOGEOGRAPHY

BRISTOL, L. M. **Social adaptation: A study in the development of the doctrine of adaptation as a theory of social progress.** With a preface by T. N. Carver. xii and 356 pp.; diagrs., bibliogr., index. (*Harvard Economic Studies*, Vol. 14.) Harvard University Press, Cambridge, 1915. $2.00. 9 x 6.

Strictly speaking, this book allots but a minimal space to anthropogeography: Ratzel and his American interpreter, Miss Semple, receive, in fact, only four pages. Buckle has six and Ripley five. These names are bracketed with that of Karl Marx under the caption "The Environmental School of Sociologists." This whole section of the volume, dedicated to "Passive Physical and Physio-social Adaptation," including "Biological Evolution" and "Neo-Darwinian Sociologists," occupies but sixty pages. These details are cited to indicate what the geographers and other natural scientists can expect to find accredited to them in this attempt to list up contributions to the understanding of social adaptation. Perhaps it would be logical to attach to the account of natural science also the chapters on the "Development of the Concept of Society as an Organism," where Schäffle, Le Bon, Durkheim, and others are cited, and that upon "The Anthropological Sociologists," including Sumner, Boas, and Westermarck. However, the section under which those names appear is entitled "Passive Spiritual Adaptation," which would seem to remove it safely from the confines of natural science.

It can be seen that the author of this study, and his adviser, do not lean very strongly toward the school of the anthropogeographers. The tendency is rather to emphasize the psychological aspects of adaptation. And so we pass on from "Passive Physical and Physio-social Adaptation" to "Passive Spiritual Adaptation," then to "Active Material Adaptation" (Ward, Patten, Carver), and finally to "Active Spiritual Adaptation" (Novicow, Carlyle, William James, Ross, Baldwin). In the end we arrive at the author's conviction that "social-personalism" is the true "social philosophy"; "we believe that the Kingdom of God will come by the spread, through reflective imitation, of the achievements of the groups setting the best example of social organization and collective welfare, and that the 'gospel of social-personalism' working by purposeful *idealization, innovation, imitation,* and *exemplification* will demonstrate its superiority over any form of deterministic monism or the gospel of the productive life."

Perhaps the general scope of this book has now been indicated. It is really a collection of the theories of many writers with respect to the concept of social adaptation, topped off by the author's theory. As such perhaps there should be no caviling as to the proportion of attention assigned to this and that theory, provided that the essentials of each are represented. And it cannot be denied that the author has produced a really remarkable set of summaries. He seems to have seized upon the central points of the several theories and to have been very happy in his exposition. He is not seldom, indeed, clearer than his originals. For these qualities and this service he is to be highly commended; it is, I think, impossible to match this volume as a brief but adequate summary of thought along this line of social evolution. Often the big idea of a big man needs less space for its presentation than the smaller and more whimsically involved conception of the theorist of lesser caliber. The reader who is able to lay his own stresses can get only good out of Professor Bristol's exposition.

However, it cannot be denied that the object of the book under review is heuristic as well as expository, and the reviewer is bound to express himself as to this matter of stresses. However fairly and dispassionately the author may present the several viewpoints, he yet works toward one of his own, and it is permissible to infer as to how he gets there. This brings me back to my opening statements as to the paucity of matter cited with reference to natural science and especially anthropogeography. It is plain enough that the author's sympathies do not go out very far in this direction. Here he is a reporter rather than an understanding adherent. He warmly commends Miss Semple's book, it is true—it "indicates a breadth of vision, a wealth of material gleaned from numerous authorities, and a general grasp of all the factors that enter into social life and social progress, that is highly satisfactory"—but he does not use the factor of environmental influence thereafter. He works over into his "purposeful *idealization, innovation, imitation,* and *exemplification*"—into the "gospel of social-personalism." If the factor of environmental influence is here, it is pretty well submerged. (I confine myself to the treatment of this factor, though there are others that are merely catalogued, labeled, and left.)

Now there is no other such safety-spot for the student of human society, amidst the confusions of his subject, as the one built up on a knowledge and appreciation of physical realities. The earth is not all bed-rock or hard-pan, and it would be a miserable place if it were; but it is necessary to get down to something that will not give at every strain, if much is going to be done up above. The skyey structure of social-personalism does not seem to rest upon immovables; you miss the connection with the lowlier, but solid things. The believer in the perennial quality of physical influences becomes uneasy when he sees them perfunctorily noted and not recurred to. It is not because he thinks his own specialty is the only thing worth while, or that geographic controls will explain everything. It is mainly because he knows that theories which do not take much account of factors whose influence is demonstrable by concrete tests and actual records are likely to be evanescent as well as fantastic.

The general form and attractiveness of the book leave nothing to be desired.

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